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# SITE BACKGROUND SUMMARY AND DETAILED SCOPE OF WORK FOUR COUNTY LANDFILL SITE FULTON COUNTY, INDIANA

REVISION: 1

AUGUST 26, 1992

PREPARED FOR:

FOUR COUNTY LANDFILL TECHNICAL COMMITTEE

PREPARED BY:

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PROJECT NO. 91302

# 5.0 SITE STABILIZATION

As described in Section 3.0, the site includes three waste disposal cells (i.e., Cells A, B, and C) with leachate collection systems comprised of primary and secondary synthetic liners, sump pumps, and separate collection tanks for leachate generated in the primary and secondary collection systems. As requested by IDEM, the Participating Respondents have included site stabilization as part of this detailed SOW. The specific tasks involved in site stabilization are described in the following subsections.

## 5.1 Background

Available records regarding site maintenance, including leachate collection, surface water management, equipment, inspections, and personnel will be reviewed. Necessary improvements or modifications to the existing systems will be discussed with IDEM's Project Manager.

## 5.2 Deliverables

The Participating Respondents will provide the necessary personnel/contractors to continue operation and maintenance activities at the site. The following tasks are anticipated to be necessary components of the site stabilization effort:

- Collect, store, and dispose of leachate generated in landfill Cells A, B, and C. Consistent with current operations, the leachate level in each cell will be maintained to ensure that it does not exceed 1 foot above the primary liner. Leachate will be collected, manifested, transported, and disposed of at the Publicly Owned Treatment Works (POTW) located in the City of Kokomo, Indiana, if such is approved by IDEM in accordance with provisions of Section 5.3 of this SOW and in accordance with applicable Federal, State and Local regulations. Until the decision regarding approval of the City of Kokomo POTW, Participating Respondents shall manifest, transport, and dispose of leachate at a facility authorized to receive such material.

- Pump surface water runoff that currently collects in Cell C to the northeast drainage control basin. If information suggests that the water collected in Cell C has come into contact with leachate, sampling and analysis may be required by IDEM.

- Continue to transfer surface water runoff collected in the southwest retention pond to the northeast drainage control basin, as needed.

- Manage the northeast retention pond in accordance with the NPDES Permit, which has historically governed discharge from the pond. Although the NPDES Permit has expired, IDEM has determined that the permit conditions, including the sampling of discharge waters, will remain in effect. Sampling reports and analytical results will be submitted to IDEM.

- Provide maintenance for: (1) pumps, hoses, and storage tanks used in the management of leachate and surface water runoff; and (2) buildings and utilities at the site.

- Maintain the waste disposal areas by ensuring that areas of erosion are repaired and that any surface leachate seeps are identified and mitigated as quickly as practicable.

- Maintain current site security, utilities, and fuel for equipment. Maintain equipment used at the site belonging to the Participating Respondents.

- Perform a landfill inspection on a weekly basis, and after storms. This inspection will include: (1) a determination that fencing and gates are in place and that utilities are operable, (2) a review of potential erosion, (3) an evaluation of the existing landfill cap, and (4) an assessment of the berms and the potential for ponding water or washouts. An inspection log will be completed and submitted to IDEM for review within 48 hours after each landfill inspection.

- Perform a daily site inspection to monitor the leachate collection and storage system. Inspect leachate storage area for leakage and deterioration of containers and dikes, including detection and storage tanks. Monitor and record the landfill leachate levels, and record the volume of leachate pumped from each cell (primary and secondary).

- Ensure that personnel involved in the site stabilization tasks are sufficiently trained and experienced in operating the equipment necessary for maintenance of site operations. This will include certification that personnel have been trained in accordance with the 40-Hour Occupational Safety and Health Administration (OSHA) personal protection and safety regulations governing activities at hazardous waste sites.

## 5.3 Options Relating to Potential Leachate Disposal at the City of Kokomo POTW

The Participating Respondents may submit information to IDEM demonstrating that the City of Kokomo POTW should be approved by IDEM for disposal of leachate from the Site. IDEM shall consider such information and request pursuant to applicable requirements of Federal, State and Local law. IDEM's decision shall be made in a timely manner and may be made prior to completion of the draft or final RI and/or FS, or prior to a final Remedial Action Decision.

# ALTERNATIVES ARRAY DOCUMENT

**Four County Landfill Site**
**Fulton County, Indiana**

**NOVEMBER 1994**

**REF. NO. 5369 (8)**

**CONESTOGA-ROVERS & ASSOCIATES**

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b) Removal:
- excavation; and
- dewatering;

c) Disposal:
- on-Site disposal
- off-Site disposal

d) Treatment:
- physical; and

e) Access Restrictions
- deed restrictions.

3.4.7 Groundwater and Leachate

The general response actions and their respective technologies to be considered for these media consist of the following:

a) No Action:
- no remedial technology;

b) Institutional Controls:
- alternate water supply;

c) Containment:
- vertical barrier;
- horizontal barrier; and

d) Collection:
- extraction; and
- leachate collection;

e) Treatment:
- leachate collection;
- biological treatment;
- chemical treatment; and
- physical treatment;

f) Disposal
- on-Site discharge;
- off-Site discharge;
- groundwater monitoring; and

g) Access Restrictions
- groundwater restrictions.

- Physical Treatment: Physical treatment of the sediment can be accomplished by stabilization or thermal treatment. With stabilization contaminants within the soil are "fixed" by mixing stabilizing reagents (e.g., lime, fly ash) with the soil. Thermal treatment thermally destroys contaminants within the sediment.

- Deed Restrictions: Restrictive covenants on deeds to landfill property or on deeds to property adjacent to the landfill are intended to prevent, or limit contact with contaminated sediments.

Screening

Studies to date fail to indicate the necessity to implement any general sediment management control technology. However, sediments accumulated within the NPDES basin will eventually require removal from this impoundment. As past monitoring has failed to indicate that this sediment is significantly contaminated, sediment disposal on Site would be an effective course of action.

### 3.5.7 Groundwater and Leachate

A summary of groundwater and leachate findings can be found within Appendices A and B, respectively. Figures 3.5, 3.6, and 3.7 taken from the Groundwater Technical Memorandum define the extent of groundwater contamination due to VOCs for lithostratigraphic Units A, B, and C, respectively. The memorandum further states that VOCs are the most significant Site-related groundwater concern. The greatest number and magnitude of VOC detections occurred in Unit A, within, or adjacent to unlined waste deposits located at the western portion of the Site (see Figure 3.5).

3.5.7.1 Alternate Water Supply

Description

This technology utilizes a public water supply to replace residential wells. Water is generally supplied to affected residences by buried forcemain.

Effectiveness

This technology is very effective in eliminating the health risk associated with ingesting contaminated water.

Implementability

There are no concerns regarding the implementability of this technology.

Evaluation

Off-Site well sampling (refer to Groundwater Technical Memorandum, October 1994) at potentially affected residences has failed to establish the requirement for local residents to be placed on an alternate water supply. As a result of these findings, this technology is presently not applicable (though potentially viable) and hence, will not be retained for detailed analysis.

3.5.7.2 Vertical Barriers

Description

The most common type of vertical barrier used at landfill sites (as well as other hazardous waste sites) to contain leachate and contaminated water is a soil-bentonite slurry wall. Soil-bentonite slurry walls are used as vertical barriers to reduce the horizontal permeability of soil.

Trenches are generally less than 200 feet deep. Trenches up to 50 feet deep are usually excavated using special backhoes: deeper trenches are excavated with clamshells or other equipment.

Effectiveness

Use of physical barriers is an established remedial technology group. However, long-term effectiveness of these systems are highly dependent upon Site-specific conditions and the degree of care used during construction. Based on data from the RI/FS Work Plan and Groundwater Technical Memorandum, soil of lithostratigraphic Unit A, a glacial till unit composed primarily of clay, appears to significantly inhibit the migration of contaminants between stratigraphic units.

Falling head permeability tests have indicated that Unit A clay soils have hydraulic conductivity values ranging from $10^{-8}$ to $10^{-5}$ cm/sec. Within Unit A soils there are numerous discontinuous zones of stratified intertill sand and gravel deposits. The higher permeability of these soils allows perched groundwater and leachate to migrate away from the Site. A slurry wall vertical barrier will have a hydraulic conductivity value generally in the order of $10^{-7}$ to $10^{-6}$ cm/sec. Consequently, the construction of a slurry wall within the existing clay till will very effectively contain leachate from migrating along sand and gravel lenses.

Implementability

This technology is readily implementable provided the required specialized services and equipment are available.

Evaluation

Based on the foregoing considerations, this technology will be retained for detailed analysis.

### 3.5.7.3 Horizontal Barriers

#### Description

Horizontal barriers are a means of bottom sealing an area of waste. This bottom sealing is accomplished by controlling the injection of slurry in notched injection holes to produce a horizontal barrier beneath the Site.

#### Effectiveness

This technology is very rarely used because of its lack of effectiveness in achieving an adequate seal and the inherent difficulty with monitoring the effectiveness of that seal.

#### Implementability

Concerns regarding the implementability of this technology are based upon the following facts:

i) accessing all areas of the applicable waste areas with the slurry is doubtful; and

ii) availability of supply and services to provide such a technology are extremely limited.

#### Evaluation

The provision of a horizontal barrier equivalent to the native soil in permeability would not be an effective course of action and hence, will not be retained for detailed analysis.

### 3.5.7.4 Extraction

Description

Groundwater is extracted at the perimeter of the landfill through a series of extraction wells to contain potential off-Site migration of contaminated groundwater/leachate.

Effectiveness

This technology is very effective in reducing the level of contaminants within the groundwater. Installation of wells in the landfill material may result in impacts to the community and workers from potential VOC or LFG emissions. According to the Groundwater Technical Memorandum, the greatest number and magnitude of VOC detections (the primary contaminant group of concern) occurred within perched water in Unit A, within, or adjacent to unlined waste deposits located in the western portion of the Site. The nature (clay) and hydraulic conductivity ($10^{-8}$ to $10^{-5}$ cm/sec) of soils within Unit A would result in extraction wells having extremely small capture zones and hence being extremely ineffective. The fine to medium grained sands and gravels of Unit B and Unit C are relatively permeable (hydraulic conductivity values ranging between $10^{-6}$ and $10^{-4}$ cm/sec) and hence are well suited to groundwater extraction.

Implementability

Implementing this technology within any stratigraphic unit is feasible.

Evaluation

Based on the foregoing considerations this technology will be retained for detailed analysis. This technology is potentially viable if contaminated water needs to be removed from Units B and C.

### 3.5.7.5 Leachate Drains/Collection Trench

Description

Leachate drains consist of underground or subsurface gravel-filled trenches generally equipped with tile or perforated pipe for greater hydraulic efficiency. The drains can be used to collect leachate and transport it to a control area for treatment or proper disposal. A system of leachate drains creates a continuous zone of influence over leachate around the area of waste.

Effectiveness

Given the relative impermeability of Unit A soils and the provision of a preferential pathway for leachate to follow this technology is considered to be a potentially highly effective method for collecting leachate.

Implementability

The installation of leachate drains around the RCRA waste cells is not required due to the waste cells having a dedicated leachate collection system in operation. There are no concerns regarding the implementability of such a technology for the General Refuse and Separate Waste areas provided that construction of such drains do not interfere or disturb buried waste.

Treatment of this non-listed leachate will need to be addressed by other technologies.

Evaluation

Based on the foregoing considerations this technology will be retained for detailed analysis.

3.5.7.6 Biological Treatment

Description

Biological means are used in treating leachate contaminated primarily by biodegradable organic compounds. Biological treatment is especially effective in treating landfill leachate that typically has high levels of BOD and COD (e.g., 0-750,000 mg/L).

In biological treatment wastewater is contacted by a culture of microorganisms either suspended in the wastewater or attached to a solid medium. The organic compounds in the wastewater are metabolized by the organisms as a food and energy source. Organics are thus removed from solution and biomass and metabolic waste gases such as carbon dioxide and methane are produced. Biological treatment systems are configured as fixed growth, suspended growth, or a combination of both. They can be designed to treat hundreds of millions of gallons per day (MGD) or as little as 1 gallon per minute (0.0015 MGD).

Biological treatment processes can be classified as aerobic or anaerobic. Aerobic treatment systems require oxygen, either in air or in pure form, to meet the metabolic needs of the microorganisms. Aerobic treatment systems are the most frequently used form of biological treatment. These systems consist of a reactor, where the waste stream is brought in contact with a culture of organisms, and usually a clarifier or other solids-separation device where organisms suspended in solution are removed by sedimentation.

Anaerobic treatment systems are used most often for treating high-strength wastes. These systems are often followed by an aerobic treatment system for additional organics removal. Compared to aerobic systems, anaerobic treatment systems produce less biomass per pound of BOD removed. In addition, anaerobic treatment produces methane of sufficiently high concentration to be used in some cases for energy recovery. Anaerobic digesters are also frequently used in the treatment of sludge produced in aerobic treatment. In this process, the sludge is reduced in volume and methane gas is produced as a by-product.

Effectiveness

The chlorinated aliphatic hydrocarbon group of contaminants detected on Site within Unit A soils (see Figure 3.5) are the most refractory to biodegradation. However, other contaminants detected, like acetone, are very amenable to biological treatment. The relative effectiveness of any biological treatment technology would need to be assessed through treatability studies.

Implementability

The equipment to implement such a technology is readily available, however the availability of trained personnel in the vicinity of the Site to operate and monitor such a treatment system is limited.

Evaluation

Based on the foregoing considerations this technology will be retained for detailed analysis.

3.5.7.7 Chemical Treatment

Description

In chemical treatment, hazardous constituents are altered by chemical reactions. During the process, hazardous compounds may be destroyed or altered; the resultant products may still be hazardous but transformed to a form that is more amenable to further processing. The most common chemical treatment for landfill leachate is precipitation of heavy metals. Precipitation will remove soluble heavy metals from leachate by forming insoluble metal hydroxides, sulfides, or carbonates. Heavy metals typically removed by precipitation include arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc. Metals are often removed to either meet NPDES permit limits or as pretreatment to reduce metals toxicity for biological treatment.

Potential treatment process options are as follows:

- Ion Exchange: Contaminated water is passed through a bed of resin material where the exchange of ions occurs between the bed and the contaminants within the water.

- Oxidation: Oxidizing agents are added to the waste for oxidation of heavy metals, unsaturated organic, sulfides, phenolics, and aromatic hydrocarbons.

- Metals Precipitation: The solubility of heavy metals is reduced through the addition of a substance that reacts with the metals or changes the pH.

- pH Adjustment: Neutralizing agents such as lime are added to adjust the pH to reduce the solubility of inorganic constituents as part of a metals precipitation process.

The precipitates of the above process are then removed from solution utilizing separation processes such as sedimentation and filtration.

Effectiveness

The effectiveness of this technology to successfully remove metals from a waste stream is well established. Most VOCs can also be removed by chemical treatment methods, however, those methods are not cost-effective in comparison to those options available under physical treatment.

## Implementability

The equipment required to implement such a technology is available, however, the availability of personnel in the vicinity of the Site to operate and monitor such a treatment system is limited.

## Evaluation

This technology will effectively remove metals from all leachate. Chemical treatment may be required to pretreat RCRA leachate prior to subsequent treatment utilizing other technologies. Based on the foregoing considerations, this technology will be retained for detailed analysis.

### 3.5.7.8 Physical Treatment

## Description

Two types of physical treatment technologies commonly used to treat leachate for the removal of organics are air stripping and granular activated carbon (GAC). Other conventional physical treatment technologies such as sedimentation and filtration may also have to be incorporated as part of the overall treatment scheme.

- Activated Carbon: Activated carbon is usually applied after conventional treatment as a polishing operation for removal of trace concentrations of residual organics and/or heavy metals. It is also used for the reduction of COD and BOD, for the removal of toxic or refractory organics, and for the removal and recovery of certain organics and inorganics from aqueous waste. Applications involving organic solutes are most effective when the solutes have a high molecular weight, low water solubility, low polarity, and a low degree of ionization. Many organic compounds such as phenolics, aromatics, and chlorinated hydrocarbons are readily adsorbed on the surface of activated carbon. In addition, certain heavy metals such as cadmium, chromium, copper, nickel, lead, and zinc can be removed from water with carbon, although this technology is not widely used for metals removal.

- Air Stripping: When leachate containing a volatile compound is brought to equilibrium conditions with air, some portion of the volatile compound transfers from the water to the air. The resulting concentrations of the volatile compound in the air and in the water are a function of the beginning concentration in the water, the temperature, the pressure, and the degree of volatility of the compound.

  Leachate contaminated with a volatile compound is fed into the top of a tower while a large air stream is forced into the bottom. The tower is usually filled with a packing medium that provides a large surface area for contact between the air and leachate. The air exits the top of the tower with the volatile compound. The leachate is collected at the bottom of the tower and is either pumped to another process area for further treatment or discharged. It should be noted that leachate may foul the packing medium and reduce the effectiveness of air stripping.

- Sedimentation: Sedimentation is the process of removing particulate matter from water in a basin by reducing the flow-through velocity. To enhance the solids removal rate, settling facilities may be augmented by upstream processes such as chemical addition/flash mixing/flocculation equipment or aeration tanks.

- Sand Filtration: Sand filtration is a physical process whereby suspended solids and colloidal impurities are removed from solution by forcing the leachate through a filter media typically consisting of a fixed bed of sand or sand with finely ground anthracite. As leachate laden with suspended solids passes through the media bed the particles become trapped on the sand bed.

Effectiveness

The effectiveness of this technology to successfully remove a wide range of contaminants from a waste stream is well established.

Almost all of the VOCs (the exception being acetone) characterized within the leachate from the RCRA waste cells and leachate originating from the unlined areas of the landfill can be treated utilizing this technology.

Implementability

The equipment required to implement this technology is readily available. Utilizing a process option like granulated activated carbon requires minimal supervision and monitoring. All of the physical treatment processes produce residuals which must be disposed of utilizing a alternative technology.

Evaluation

This technology will effectively treat the vast majority of compounds associated with the two different leachates. The compound acetone within leachate originating from the RCRA waste cells and unlined areas of the landfill is not amenable to treatment by physical processes and must be removed utilizing an alternate treatment technology (e.g., biological treatment).

Based on the foregoing considerations, this technology will be retained for detailed analysis.

### 3.5.7.9 On-Site Discharge

Description

The most common technologies used at landfill sites to treat leachate include biological treatment for removal of biodegradable organics, physical treatments such as air stripping and carbon adsorption for VOC removal, and chemical treatment, such as metals precipitation for removal of inorganics. Treated leachate could be discharged on Site depending on the extent of treatment. On-Site discharge can be done by groundwater aquifer reinjection or by discharge to surface water.

Groundwater aquifer reinjection depends on Indiana state groundwater standards. Discharge to surface water will have to comply to NPDES Permit requirements.

Effectiveness

On-Site surface discharge of groundwater is only feasible when contaminated water has been treated to regulatory levels. On-Site surface discharge of treated water is effective provided such water meets NPDES permit standards and provided the volume of the present surface impoundments are sized properly such that the addition of this treated water will not exceed the design capacity [regulated by 40 CFR 264.301 (i)].

Aquifer reinjection (although effective for disposing of treated groundwater/leachate) is not implementable for groundwater/leachate extraction from Unit A based on jurisdictional requirements, see below.

Implementability

There are no major concerns regarding the implementability of discharging treated groundwater/leachate to on-Site surface impoundments. For such an action to take place, an on-Site treatment facility would be required. The decision to implement this option is entirely contingent upon the decision to construct an on-Site treatment facility (discussed previously within Sections 3.5.7.8, 3.5.7.7, and 3.5.7.6).

Aquifer reinjection is not an implementable option for groundwater/leachate extraction from Unit A as Federal and State standards restrict such an action [40 CFR 144.13 (c)]. Aquifer reinjection is allowed by law if treated groundwater is injected into the same formation from which it was withdrawn, which in the case of Unit A is not a viable course of action. For groundwater extracted from Units B or C aquifer reinjection is a potential course of action that is readily implementable.

Evaluation

Based on the foregoing considerations this technology will be retained for detailed analysis. The process option of aquifer reinjection for groundwater extracted from Units B and C will be retained for detailed analysis.

3.5.7.10 Off-Site Discharge

Description

Two technologies exist to dispose of groundwater/leachate off Site, namely:

a) treatment of leachate at a Publicly Owned Treatment Works (POTW); and

b) treatment of leachate and sludge at a RCRA-permitted Treatment/Storage Disposal Facility (TSDF).

Further details on each technology are provided by the following:

- POTW: Direct discharge to a POTW is appropriate for leachate waste streams containing concentrations of contaminants that are amenable to treatment provided by the POTW. In some cases, pretreatment may be required before discharge to the POTW. Major considerations include the constituents of the leachate and their concentrations, the type of treatment used by the POTW, the excess available treatment capacity of the POTW, the volume of leachate to be disposed of, and the expected duration of the discharge.

  Treatment to reduce the concentrations of organics and metals can be expected at most POTWs especially those providing secondary treatment. The removal efficiency depends on the type and concentration of contaminants. Removal of organics will be primarily from stripping in aeration basins, adsorption onto the biological floc, and biological degradation.

The need for treatability testing or pretreatment of the waste stream must be determined on the basis of the probable effect of the contaminants on the POTW.

Treatment processes typically employed at POTWs include:

- aerobic processes that incorporate rotating biological contactors, oxidation ditches, activated sludge reactors, and trickling filters;

- anaerobic processes that incorporate anaerobic contact reactors, anaerobic filters, fluidized bed systems, and various fixed - film systems; and

- physical/chemical processes including dissolved -gas flotation, chemical coagulation, sedimentation, and filtration.

Special considerations for discharge to a POTW include the proximity of the nearest POTW sanitary sewer sufficient to handle the flow, pretreatment requirements, and the potential health risk to POTW employees of treating wastes.

The closest POTW known to be suitable and amenable to the acceptance of Four County leachate is located in the City of Kokomo which is approximately 55 miles away from the landfill.

- <u>TSDF:</u> A TSDF is a RCRA-permitted facility that is authorized to treat and dispose of hazardous waste materials. There are a number of facilities in Indiana available to treat and dispose of F039 listed leachate and sludge. The selection of a facility is contingent upon the waste characteristics. The closest facility available to the Four County Landfill Site is approximately 55 miles away.

Effectiveness

On the basis of operational details provided by the Kokomo POTW, the following major findings are noted with respect to effectiveness of treatment:

i) The expected maximum monthly volume of leachate which would be introduced to the POTW (50,000 gallons) represents less than one-half of one percent of the daily flow influent into the POTW (approximately 15,000,000 gallons).

ii) Compounds detected in the leachate are generally present in the low part per million range. Increased contaminant loading as a result of these low concentrations and minimal increased flows would likely be too small to quantify.

iii) The resultant low contaminant loading levels will not adversely affect the operation or the efficacy of removal at the POTW.

iv) The compounds detected in Four County Landfill leachate are generally amendable to treatment at a POTW.

In short, the Kokomo POTW has both the capability and the excess capacity to handle the leachate. For its part, the City of Kokomo has expressed an interest in receiving Four County Landfill leachate for treatment of its POTW.

Treatment of leachate at a RCRA-permitted TSDF is effective and is currently the discharge mode for existing flows from this Site.

Implementability

Off-Site discharge of groundwater/leachate at either a POTW (such as Kokomo) or a RCRA-permitted TSDF is easily implemented and therefore, there are no concerns regarding the implementability of this technology.

Evaluation

Based on the foregoing considerations, this technology group will be retained for detailed analysis. Moreover and pursuant to Section 5.3 of the SOW, further information will be reviewed and provided regarding the POTW off-Site discharge option.

3.5.7.11 Groundwater Monitoring

Description

The technology utilizes existing or new monitoring wells to detect changes in groundwater movement or contamination.

Effectiveness

There are no concerns regarding the effectiveness of this technology.

Evaluation

Based on the foregoing considerations, this technology will be retained for detailed analyses.

Implementability

Due to the vast array of monitoring wells available and the success of past monitoring activities there are no concerns regarding the implementability of this technology.

3.5.7.12 Groundwater Restrictions

Description

Restrictive covenants on groundwater usage are intended to prevent or limit the use of extracted groundwater. Restrictive covenants, written into the landfill property deed notifies any potential purchaser of the landfill property that groundwater extracted at the Site may be contaminated and that water use must be restricted and regulated to ensure that there are no health concerns.

Effectiveness

The effectiveness of restrictive covenants depends on State and local laws, continued enforcement, and maintenance. Restrictive covenants and regulations to restrict the use of groundwater extracted at the Site will be effective when teamed with other technologies like fencing. Off-Site use of water contaminated by Site activities will not be effectively restricted by implementing groundwater restrictions as aquifer use is voluntary.

Implementability

Concerns regarding the implementability of the technology are shared with those outlined within Section 3.5.2.1.

Evaluation

Groundwater restrictions should be retained as potential components of the remedial alternatives due to their moderate effectiveness in preventing human exposure to potentially contaminated water. Studies to date have failed to indicate the requirements for any off Site groundwater restrictions, however, given that there is a potential for contamination to take place groundwater restrictions will be retained for detailed analyses.

# 4.0 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

## 4.1 GENERAL

The development of Remedial Action Alternatives (RAA) is based upon combinations of the remaining remedial technologies and associated process options required to address the Remedial Action Objectives detailed within Table 3.1. RAAs presented within this document are based on research and studies to date. The ongoing accumulation of technological information will further contribute to the addition and/or modification of RAAs presented within the AAD. In lieu of this fact the RAAs presented within this section and summarized on Table 4.1 should be viewed as preliminary and subject to change.

## 4.2 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

### 4.2.1 Shared Technologies

With the exception of Alternative A1 - No Action, there are a number of technologies that should be shared by all alternatives. These technologies are as follows:

- Deed Restrictions and Groundwater Restrictions: This technology group should be carried throughout all the alternatives in order to ensure that there is a legal basis for protecting human health and protecting future remediation efforts.

- LFG Monitoring: Studies to date have failed to indicate the requirement for LFG remedial actions to be implemented. However, LFG generation and accumulation could change and hence LFG should be further monitored in order to determine what, if any, remediation effort will be required.

- Groundwater and Leachate Monitoring: Leachate being produced by all waste areas will require monitoring in order to assess the extent and severity of contamination. Groundwater within Units B and C will require monitoring in order to determine what, if any, remediation effort will be required.

- Surface Water Gauging Stations: This technology should be retained within all potential alternatives in order to monitor the potential contamination of surface water.

### 4.2.2 Alternative A1 - No Action

This alternative is required by the NCP to be carried throughout the screening process. This alternative assumes that no action other than what is currently taking place will occur.

### 4.2.3 Alternative A2

This alternative seeks to address the threat posed by the landfill contents and leachate generated by the RCRA waste cells. This alternative assumes a native soil cover over the General Refuse and Separate Waste areas and RCRA composite barrier cap over the RCRA waste cells. This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA composite barrier cap over RCRA waste cells;
- regrading and revegetation; and
- on-Site treatment of RCRA leachate and on-Site discharge.

### 4.2.4 Alternative A3

This alternative seeks to address the threat posed by the landfill contents and leachate generated by the RCRA waste cells.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation; and
- on-Site pretreatment (if required) of RCRA leachate and subsequent discharge to POTW.

### 4.2.5 Alternative A4

This alternative seeks to address the threat posed by the landfill contents and leachate generated by the RCRA waste cells.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation;

- off-Site treatment/disposal of RCRA leachate at a TSDF facility.

### 4.2.6 Alternative A5

This alternative seeks to address the threat posed by the landfill contents and leachate generated by all waste areas.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- leachate collection trench around General Refuse and Separate Waste areas; and
- on-Site treatment/disposal of all leachate with treatment residuals being disposed at a TSDF facility.

### 4.2.7 Alternative A6

This alternative seeks to address the threat posed by the landfill contents and leachate generated by all waste areas.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;

- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- leachate collection trench around General Refuse and Separate Waste areas; and
- off-Site treatment/disposal of leachate at POTW (with or without pretreatment).

### 4.2.8 Alternative A7

This alternative seeks to address the threat posed by the landfill contents and leachate generated by all waste areas.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- leachate collection trench around General Refuse and Separate Waste areas; and
- off-Site treatment/disposal of leachate at a TSDF.

This alternative should only be considered when relatively small volumes of leachate require treatment due to the high costs associated with treatment/disposal at a TSDF.

### 4.2.9 Alternative A8

This alternative seeks to address the threat posed by the landfill contents, leachate generated by all areas and groundwater contamination. Whereas in Alternatives A5 to A7 a leachate collection trench was utilized, Alternative A8 will utilize a vertical barrier slurry wall to contain the leachate and a groundwater extraction system to collect the leachate/groundwater for treatment.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA-composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- vertical barrier slurry wall around General Refuse and Separate Waste areas;
- groundwater extraction system to extract water from Units B and C; and
- on-Site treatment/disposal of all leachate/groundwater with treatment residuals being disposed of at a TSDF facility.

### 4.2.10 Alternative A9

This alternative seeks to address the threat posed by the landfill contents, leachate generated by all areas and groundwater contamination. Similar to Alternative A8, this alternative will utilize a vertical barrier slurry wall and a groundwater extraction system.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- vertical barrier slurry wall around General Refuse and Separate Waste areas;
- groundwater extraction system to extract water from Units B and C; and
- off-Site treatment/disposal of leachate at a POTW (with or without pretreatment).

### 4.2.11 Alternative A10

This alternative seeks to address the threat posed by the landfill contents, leachate generated by all areas and groundwater contamination. Like Alternative A8 this alternative will utilize a vertical barrier slurry wall and a groundwater extraction system.

This alternative consists of the following technologies:

- shared technologies outlined in Section 4.2.1;
- upgrade native soil cover on General Refuse and Separate Waste areas;
- RCRA composite barrier cap over RCRA waste cells;
- regrading and revegetation;
- vertical barrier slurry wall around General Refuse and Separate Waste areas;
- groundwater extraction system to extract water from Units B and C; and

- off-Site treatment/disposal of all leachate at a TDSF.

This alternative should only be considered when relatively small volumes of groundwater/leachate require treatment due to the high costs associated with treatment/disposal at a TSDF.

### 4.2.12 Alternatives B2 to B10

Alternatives B2 to B10 are respectively identical to Alternatives A2 to A10 with one exception. Alternatives B2 to B10 would utilize a RCRA-composite barrier cap over all waste areas and not just over the RCRA waste cells.

**CRA**
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(708) 299-9933

# MEMO

TO: Four County Landfill Leachate Disposal Committee

REFERENCE NO: 5369-95

FROM: Conestoga-Rovers & Associates

DATE: May 12, 1994

RE: Kokomo Leachate Disposal Option

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## OVERVIEW

The following memo has been prepared to summarize pertinent issues related to the disposal of leachate from the Four County Landfill in Fulton County, Indiana (Site) at the City of Kokomo's wastewater treatment plant. Leachate from this landfill has previously been classified by the government as a listed hazardous waste pursuant to the Resource Conservation and Recovery Act (RCRA). However on the basis of characterization data reviewed to date, only a few leachate constituents are problematic from the standpoint of relative risk pursuant to the USEPA's ("The Agency's") Health Based Number (HBN) criteria. Further details on the characteristics of the leachate, the City of Kokomo's relationship to the Landfill and the similarity of leachate from this Site with other landfill-derived leachate not categorized as hazardous by the Agency are provided in the following.

## BACKGROUND

The Four County Landfill commenced operation as a permitted sanitary landfill in 1972. In 1978, the facility was approved to accept industrial waste by the Indiana State Board of Health, the predecessor to Indiana Department of Environmental Management (IDEM). In 1980, the landfill was granted interim status under RCRA. During the period of 1980 to 1986, wastes defined as hazardous under RCRA were co-disposed with other wastes including municipal wastewater treatment sludge. From 1986 until the facility ceased operations in 1989, wastes were disposed in lined landfill cells. The base of these lined cells was constructed of synthetic liners separated by a drainage layer which facilitated the collection of water. There are three such lined cells present at the Four County Landfill which are currently accumulating an average of approximately 50,000 to 60,000 gallons of leachate per month. However, since the Agency has previously classified the leachate as hazardous (on the basis of the Site's past operations), it is being managed and disposed of as such without regard to its relatively innocuous nature.

In August 1993, a group of responsive potentially responsible parties (PRPs) voluntarily entered into an Agreed Order on Consent with the IDEM to perform a Remedial Investigation/Feasibility Study (RI/FS) and to conduct site maintenance activities at the Four County Landfill. The Four County Landfill Group (Group) was organized in order to effectively manage the work required under the Agreed Order and to move the work along in an efficient and timely manner toward implementation of the final remedy. The Group consists primarily of industrial entities and municipalities that legitimately disposed of waste at this Site under the (mistaken) belief that its operations were technically sound and wholly in accordance with the law.

DISCUSSION

One aspect of the current Site maintenance includes collection and disposal of leachate generated at the Site. The transportation and disposal of the leachate as a hazardous waste is exceedingly costly. The anticipated expenditures for transport and disposal of leachate are expected to exceed $200,000 in the 1994 calendar year alone. The leachate is transported by tanker truck to a hazardous waste disposal facility located in excess of 200 miles from the Site. On average, 50,000 gallons of this leachate is transported to the hazardous waste disposal facility each month. Leachate will continue to be produced at the landfill for the foreseeable future. Although the rate of leachate production may decline upon implementation of a final Site remedy, leachate management will continue to represent a large portion of the cost of Site operation and maintenance.

The City of Kokomo, Indiana, is the fourth largest participating PRP in the Group (approximately an 8 percent contributor) having disposed of non-RCRA hazardous municipal sewage sludge at the Site. Kokomo's share of the cost for the RI/FS, Site maintenance and the final remedy is likely to be substantial. It is understood that the Kokomo POTW does not have the ongoing revenues or other financial resources to absorb these costs. This will likely result in Kokomo's allocated share of the remedial costs being recovered more or less directly from current users of the POTW.

The Group has moved in an expeditious manner toward resolution of this situation and has agreed to grant the City of Kokomo credit toward its allocated share in return for disposal of the leachate generated at the Site at the Kokomo POTW. However, neither IDEM nor the Agency has been able to approve the action on the basis of several "technicalities" present in the RCRA regulations. These technicalities deal primarily with the methods of leachate delivery to the POTW rather than with the relative risks, implementability and the Agency's classification of POTW sludges resulting from leachate treatment.

Normally wastewaters from a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site such as this are excluded from the

RCRA restrictions as a solid waste under the domestic sewage exclusion if it can be shown that acceptance of these wastes will not result in a violation of the Clean Water Act (CWA) and that these wastes can be introduced to the domestic sewage pipeline upstream of the POTW. In fact, the Kokomo POTW has already participated in a similar process having received and treated liquid hazardous waste from the Continental Steel Corporation Superfund Site under the domestic sewage exclusion. Also, coincidentally, the management and financing of the Continental Steel Corporation Superfund Site is by the Agency rather than a group of private entities and municipalities.

The Group and the City of Kokomo have approached IDEM on a number of different occasions to obtain approval for the option of delivering the leachate to the Kokomo POTW by truck and introducing the leachate to the sanitary system pipeline upstream of the POTW. In fact, the City of Kokomo has an ordinance to assist in this process. To date, IDEM has been unreceptive to this strategy. RCRA regulations and Agency guidance documents allow the domestic sewage exclusion to be applied only to liquid hazardous waste introduced to the domestic sewage pipeline on site or at a hazardous waste treatment facility. In accordance with the "Permit by Rule" regulations, the POTW is deemed to have a permit under RCRA to treat hazardous waste if acceptance of this waste does not result in a violation of the CWA. However, IDEM has taken the position that the domestic sewage exemption does not apply to a permit by rule facility. This strict interpretation of the domestic sewage exclusion rule does not allow for other reasonable considerations such as the composition of the waste, the capability of the POTW to effectively treat the waste and meet the CWA requirements, the effectiveness and implementability of the approach, consideration of the minimal risk involved with the approach and the benefit to the community as a whole.

According to IDEM's current interpretation of the RCRA regulations, acceptance of the leachate from the Four County Landfill would also result in all municipal sludge generated at the POTW becoming a listed hazardous waste in accordance with the mixture rule (40 CFR Part 261.3). Management of the municipal sewage sludge as a hazardous waste would result in a large increase in cost to the Kokomo tax base. These additional costs are not justified since treatment of the leachate at the POTW would likely not result in a significant change in the volume or characteristics of the municipal sewage sludge or in the concentration of these substances in the POTW's process effluent. This is true for the following four reasons.

i) The expected average <u>monthly</u> volume of leachate which would be introduced to the POTW (50,000 gallons) represents less than one-half of one percent of the <u>daily</u> flow of influent into the POTW (approximately 15,000,000 gallons).

ii) Compounds detected in the leachate are generally present in the low part per million range. Increased contaminant loading as a result of these low concentrations and minimal increased flows would likely be too small to quantify.

iii) The resultant low contaminant loading levels will not adversely affect the operation or the efficacy of removal at the POTW.

iv) The compounds detected in Four County Landfill leachate are generally amenable to treatment at a POTW.

In short, the Kokomo POTW has both the capability and the excess capacity to handle the leachate. Moreover, it is highly unlikely that the acceptance of the leachate would result in a violation of the CWA. For its part, the City of Kokomo is desirous of both remaining a viable PRP and obtaining a credit for its allocated share of the investigation, maintenance and cleanup costs for the Four County Landfill.

## LEACHATE CHEMISTRY

CRA has evaluated available data from leachate monitoring events that were undertaken between April 1987 and September 1993 (Table 1). The analytical database for the leachate to date includes the results for a list of approximately 200 different compounds of concern. On the basis of an evaluation of the available leachate analytical data, the chemical character of the leachate is not dissimilar to leachate generated at numerous other landfill sites with similar wastes deposited.

Between April 1987 and September 1993, eleven leachate samples were collected from the Four County Landfill. The majority of the collected samples were analyzed for approximately 200 individual compounds including: 50 volatile organic compounds (VOCs), 80 semivolatile organic compounds (SVOCs), 30 pesticides/polychlorinated biphenyls (PCBs), 14 metals and cyanide. Additionally, the sample collected in September 1993 was analyzed for four chlorinated herbicides, five organophosphorous pesticides and ten polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF).

A total of 35 of the 200 compounds analyzed were reported at concentrations which exceeded the applicable laboratory reporting limits.

## LEACHATE EVALUATION

During hazardous waste delisting decisions, the USEPA evaluates the concentrations of constituents in a petitioned waste against health based numbers (HBNs). Only 19 of the 35 compounds detected in the leachate exceed the Agency's HBNs.

In order to calculate possible exposure to hazardous constituents by a hypothetical receptor as a result of a release under a worst-case management scenario, the Agency uses an appropriate fate and transport model. These fate and transport models use leachable concentrations of hazardous substances in the waste and the volume of waste generated in order to determine a dilution/attenuation factor (DAF) for the waste. The DAFs provide a conservative estimate of environmental factors which result in a reduction of the concentrations of hazardous substances to which a receptor may be exposed. Concentrations of hazardous substances present in the waste are multiplied by the appropriate DAF in order to calculate the delisting levels. Using the Agency's Composite Landfill Model (CLM) to predict fate and transport, DAFs range from 12 for annual waste volumes of 300,000 cubic yards per year (cu yd/yr) to 100 for annual waste volumes of 1,000 cu yd/yr. Only seven of the 35 compounds detected in Four County Landfill leachate exceeded the delisting level using a DAF of 12.

Currently, an average of approximately 50,000 to 60,000 gallons of leachate are being generated on a monthly basis at the Four County Landfill. This corresponds to an annual production rate of approximately 600,000 to 720,000 gallons of leachate per year. Using this production rate, a probable DAF for the Four County Landfill leachate would be approximately 60. Only three of the 35 compounds detected in Four County Landfill leachate exceeded the delisting levels calculated using a DAF of 60. One of these compounds (Aldrin) was detected in the leachate only once. The remaining two compounds (nickel and methylene chloride) only occasionally exceeded the delisting level using a DAF of 60.

Limited pretreatment of the leachate occurs at the Site prior to off-site disposal. On-site pretreatment of leachate, which is allowed without a permit in accordance with Section 121 of CERCLA, is basically a two-step process involving flow equalization and settlement of suspended solids. Due to the transient nature of leachate generation, flow equalization is accomplished through the consolidation of the generated leachate into steel holding tanks prior to removal from the Site. In addition, the steel holding tanks serve as settling basins which allow suspended solids present in the leachate to be separated from the leachate by gravity settling during the period of time that the leachate is present within the holding tanks. Leachate is removed from the holding tanks in a manner which allows for the removal of the liquids while the settled solids remain in the holding tanks. Settled solids are removed from the holding tanks on a periodic basis.

## POLLUTANT MASS LOADING SUMMARY

Approximately 50,000 to 60,000 gallons of leachate are currently being collected on average, per month at the Four County Landfill for off-Site disposal. On the basis of a review of the leachate production records available at the Site (November 1991 to March 1994), the range of leachate production rates were evaluated. The maximum monthly production rates for each of the lined cells is summarized below:

| *Cell* | *Maximum Monthly Production (gallons)* |
|---|---|
| Cell A | 5,000 (February 1991) |
| Cell B | 36,500 (March 1993) |
| Cell C | 29,200 (January 1993) |

Summing the maximum monthly production rate for each of the lined cells gives the maximum monthly volume of leachate (71,000 gallons) which may be expected to be generated at the Four County Landfill.

Table 2 presents a summary of the potential maximum monthly loading of the 35 individual analytes detected in the Four County Landfill leachate. The maximum concentrations of these individual analytes, in milligrams per liter, were obtained from the leachate analytical data presented in Table 1. On the basis of these maximum analyte concentrations and the 50,000 to 71,000 gallon per month leachate generation range, the greatest mass of each analyte that may be introduced to the POTW in a one month period was calculated. Assuming no change in the characteristics of the leachate to be delivered to the Kokomo POTW for treatment/disposal, the monthly mass loading values represented on Table 2 may represent the maximum monthly mass loading of analytes which would be introduced into the POTW.

Results indicate that the maximum expected mass loading of organic compounds including VOCs, SVOCs, pesticides/PCBs and total cyanide is approximately 158 kilograms per month (349 pounds/month). According to Kokomo POTW operations staff, loading of organic analytes at the rates calculated would not result in an adverse impact to the operation of the POTW.[1]

Based on the historical data summarized in Table 2, the maximum expected mass loading for inorganic analytes may be approximately 2,020 kilograms per month (4,460 pounds per month). However, in excess of 90 percent of the monthly mass loading of inorganic analytes (1,900 kilograms per month) is due to the presence of sodium and calcium in the leachate and would not impact the operational efficiency of the POTW. Iron comprises in excess of 90 percent of the remaining inorganic analytes present in the leachate and also, would not impact the operational efficiency of the POTW.[1] Other inorganic analytes of potential concern such as copper, cadmium, chromium, arsenic, lead and zinc would be expected to comprise less than 0.02 percent of the inorganic contaminant mass in the leachate on a monthly basis.

[1]Personal communication on April 13, 1994, Tom High, Kokomo POTW to Steve Wanner, CRA.

The concentration of individual constituents at the POTW were predicted on the basis of the expected loading of analytes present in the leachate. To develop a worst case scenario, the maximum concentrations of individual analytes (Table 2) were used in a mass balance equation to calculate the expected concentrations of analytes at the POTW as a result of the introduction of Four County Landfill leachate. The concentration of analytes present in the POTW influent and the daily volume of influent into the POTW were provided by representatives of the Kokomo Municipal Sanitation Utility. In general, for constituents which were not detected in the influent, the concentration of constituents were set at one-half of the laboratory reporting limit. If no data on a particular constituent were available, the constituent concentration was set at zero. The maximum anticipated volume of leachate expected to be delivered to the POTW in any given day was set at 15,000 gallons. This volume exceeds the maximum volume generally shipped from the Site, approximately 11,500 gallons, in a given day, since the Four County Landfill Group assumed operation and maintenance of the Site.

The mass balance equation used to predict the concentration of each constituent at the POTW as a result of introduction of Four County Landfill leachate is presented below:

$$Z = \{(V_i \cdot X) + (V_l \cdot Y)\}/\{V_i + V_l\}$$

where: $Z$ = predicted analyte concentration at the POTW in milligrams per liter (mg/L);

$V_i$ = volume of Kokomo POTW influent in million liters per day (MLD);

$V_l$ = volume of leachate introduced in MLD;

$X$ = Kokomo POTW influent analyte concentration in mg/L; and

$Y$ = maximum observed leachate analyte concentration in mg/L.

Under worst-case conditions, the predicted concentration of each analyte at the POTW as a result of the delivery of 15,000 gallons of leachate in a given day, are summarized in Table 3. In general, results of the mass balance calculations predict the following conditions at the POTW as a result of the delivery of 15,000 gallons of leachate in a given day:

- concentrations of individual VOCs at the plant would range from 0.0006 mg/L (1,1-dichloroethane and 1,2-dichloroethane) to 0.120 mg/L (n-butyl alcohol);

- concentrations of individual SVOCs range from 0.0001 mg/L (butylbenzylphthalate) to 0.23 mg/L (benzoic acid);
- concentrations for each of the three pesticide compounds detected in Four County Landfill leachate are 0.0001 mg/L; and
- concentrations of individual inorganics analytes ranged from 0.0001 mg/L (arsenic and vanadium) to 7 mg/L (sodium).

The treatment process for influent at the POTW consists of a primary settling in a tank, followed by treatment by activated sludge, then chlorination prior to tertiary filtration through a multi-media sand filter and finally aeration by cascading the wastewater over a series of hydraulic jumps, prior to discharge to the Wildcat Creek. In general, the variety and concentrations of constituents detected in leachate from the Four County Landfill are low. The amount of leachate which would be delivered to the POTW would be exceedingly small relative to the amount of influent entering the POTW on a daily basis from the existing combined industrial, commercial and residential sources resulting in a dilution of the leachate on the order of 1,000 times. Moreover, the organic analytes present in concentrations of concern such as the ketones, alcohols, acetone, tetrahydrofurans, benzoic acid and phenols would be expected to be amenable to treatment by aerobic and anaerobic degradation which would occur at a treatment facility such as the Kokomo POTW.

In light of the above, it would be reasonable to expect that under worst-case conditions the amount of pollutant loading resulting from the acceptance of leachate from the Four County Landfill would be negligible by comparison to the loading currently accepted by the POTW. Moreover, according to the Kokomo POTW operations personnel, the inorganics analytes present in the leachate are amenable to the treatment process employed at the Kokomo POTW and inorganic analytes would either be effectively removed or would not affect the operational efficacy of the POTW nor would the expected loading from the leachate result in violations of the POTW's operations permit.[2]

BCC/ko/16

[2]Personal communication on April 13, 1994, Tom High, Kokomo POTW to Steve Wanner, CRA.

# TABLE 1

## SUMMARY OF LEACHATE ANALYTICAL DATA
## FOUR COUNTY LANDFILL SITE
## FULTON COUNTY, INDIANA

| *Volatiles* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | mg/L | 7.5 [16] | ND(0.10) [17] | 17 | 1.8 | 9.1 | 17 | 11 | 13 |
| Acetonitrile | mg/L | NA [18] | NA | NA | NA | NA | NA | NA | NA |
| Acrolein | mg/L | ND(1.3) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.50) | ND(0.25) | ND(0.25) | ND(0.25) |
| Acrylonitrile | mg/L | ND(1.3) | ND(0.70) | ND(0.70) | ND(0.70) | ND(0.70) | ND(0.35) | ND(0.35) | ND(0.35) |
| Allyl chloride (3-Chloropropylene) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Benzene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Bromodichloromethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Bromoform | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Bromomethane | mg/L | ND(0.25) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| 2-Butanone (MEK) | mg/L | 5.7 | 1.6 | 14 | 0.86 | 6.6 | 7.7 | 8.0 | 7.1 |
| n-Butyl alcohol | mg/L | NA | NA | NA | NA | NA | NA [19] | NA | NA |
| Carbon disulfide | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | 0.025J | ND(0.025) | ND(0.025) |
| Carbon tetrachloride | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Chloroacetaldehyde | mg/L | ND(1.3) | NA | NA | NA | NA | NA | NA | NA |
| Chlorobenzene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Chloroethane | mg/L | ND(0.25) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| 2-Chloroethyl vinyl ether | mg/L | ND(0.25) | NA | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| Chloroform | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Chloromethane | mg/L | ND(0.25) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| Chloroprene (2-Chloro-1,3-butadiene) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Cyclohexanone | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Dibromochloromethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |

## TABLE 1

## SUMMARY OF LEACHATE ANALYTICAL DATA
## FOUR COUNTY LANDFILL SITE
## FULTON COUNTY, INDIANA

| *Volatiles* | *Concentration Units* | C[9] *Secondary 11/2/89* | C[10] *Secondary 11/2/89* | *F039 Scan 9/30/93* [11] | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| Acetone | mg/L | 12 | 11 | 15 | 4 | 40 | 48 | 400 |
| Acetonitrile | mg/L | NA | NA | ND(0.05) | 0.2 | 2 | 2.4 | 20 |
| Acrolein | mg/L | ND(0.25) | ND(0.50) | ND(0.05) | 0.7 | 7 | 8.4 | 70 |
| Acrylonitrile | mg/L | ND(0.35) | ND(0.70) | ND(0.07) | 0.00006 | 6E-04 | 0.00072 | 0.006 |
| Allyl chloride (3-Chloropropylene) | mg/L | NA | NA | ND(0.02) | 0.002 | 0.02 | 0.024 | 0.2 |
| Benzene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| Bromodichloromethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.0003 | 0.003 | 0.0036 | 0.03 |
| Bromoform | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.004 | 0.04 | 0.048 | 0.4 |
| Bromomethane | mg/L | ND(0.05) | ND(0.10) | ND(0.01) | 0.05 | 0.5 | 0.6 | 5 |
| 2-Butanone (MEK) | mg/L | 11 | 10 | 4.2 | 2 | 20 | 24 | 200 |
| n-Butyl alcohol | mg/L | NA | NA | 120 | 4 [20] | 40 [20] | 48 [20] | 400 [20] |
| Carbon disulfide | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 4 | 40 | 48 | 400 |
| Carbon tetrachloride | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| Chloroacetaldehyde | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Chlorobenzene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.1 | 1 | 1.2 | 10 |
| Chloroethane | mg/L | ND(0.05) | ND(0.10) | ND(0.01) | NE | NE | NE | NE |
| 2-Chloroethyl vinyl ether | mg/L | ND(0.05) | ND(0.10) | NA | NE | NE | NE | NE |
| Chloroform | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.006 | 0.06 | 0.072 | 0.6 |
| Chloromethane | mg/L | ND(0.05) | ND(0.10) | ND(0.01) | 0.003 | 0.03 | 0.036 | 0.3 |
| Chloroprene (2-Chloro-1,3-butadiene) | mg/L | NA | NA | ND(0.005) | 0.7 | 7 | 8.4 | 70 |
| Cyclohexanone | mg/L | NA | NA | ND(0.36) | NE | NE | NE | NE |
| Dibromochloromethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.0004 | 0.004 | 0.0048 | 0.04 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Volatiles Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dibromo-3-chloropropane (DBCP) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2-Dibromoethane (EDB) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Dibromomethane | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| trans-1,4-Dichloro-2-butene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Dichlorodifluoromethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,1-Dichloroethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | 0.078 | 0.029 | ND(0.025) | ND(0.025) |
| 1,2-Dichloroethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | 0.061 | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,1-Dichloroethene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,2-Dichloroethene (total) | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,2-Dichloropropane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| cis-1,3-Dichloropropene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| trans-1,3-Dichloropropene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,4-Dioxane | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Ethyl acetate | mg/L | NA | NA | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| Ethyl benzene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Ethylene oxide | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Ethyl ether | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Ethyl methacrylate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Iodomethane | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Isobutanol | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Hexanone | mg/L | ND(1.3) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | 0.043J | 0.095 | ND(0.05) |
| Methacrylonitrile | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Methanol | mg/L | ND(0.25) | NA | NA | NA | NA | NA | NA | NA |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | C [9] Secondary 11/2/89 | C [10] Secondary 11/2/89 | F039 Scan [11] 9/30/93 | HBN [12] | HBN x 10 [13] | HBN x 12 [14] | HBN x 100 [15] |
|---|---|---|---|---|---|---|---|---|
| *Volatiles Continued* | | | | | | | | |
| 1,2-Dibromo-3-chloropropane (DBCP) | mg/L | NA | NA | ND(0.01) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| 1,2-Dibromoethane (EDB) | mg/L | NA | NA | ND(0.005) | 0.00005 | 5E-04 | 0.0006 | 0.005 |
| Dibromomethane | mg/L | NA | NA | ND(0.005) | 0.4 | 4 | 4.8 | 40 |
| trans-1,4-Dichloro-2-butene | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Dichlorodifluoromethane | mg/L | ND(0.025) | ND(0.05) | ND(0.01) | 7 | 70 | 84 | 700 |
| 1,1-Dichloroethane | mg/L | 0.036 | ND(0.05) | 0.07 | 4 | 40 | 48 | 400 |
| 1,2-Dichloroethane | mg/L | **0.082**** | **0.090**** | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| 1,1-Dichloroethene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.007 [21] | 0.07 [21] | 0.084 [21] | 0.7 [21] |
| 1,2-Dichloroethene (total) | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.07/0.1 | 0.7/1 | 0.84/1.2 | 7/1 |
| 1,2-Dichloropropane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| cis-1,3-Dichloropropene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| trans-1,3-Dichloropropene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| 1,4-Dioxane | mg/L | NA | NA | ND(1.0) | 0.003 | 0.03 | 0.036 | 0.3 |
| Ethyl acetate | mg/L | ND(0.05) | ND(0.10) | ND(0.01) | 30 [20] | 300 [20] | 360 | 3000 [20] |
| Ethyl benzene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.7 | 7 | 8.4 | 70 |
| Ethylene oxide | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Ethyl ether | mg/L | ND(0.025) | ND(0.05) | ND(0.01) | 7 | 70 | 84 | 700 |
| Ethyl methacrylate | mg/L | NA | NA | ND(0.005) | 3 | 30 | 36 | 300 |
| Iodomethane | mg/L | NA | NA | ND(0.01) | NE | NE | NE | NE |
| Isobutanol | mg/L | NA | NA | 42 | 10 | 100 | 120 | 1000 |
| 2-Hexanone | mg/L | ND(0.05) | ND(0.10) | NA | NE | NE | NE | NE |
| Methacrylonitrile | mg/L | NA | NA | ND(0.02) | 0.004 | 0.04 | 0.048 | 0.4 |
| Methanol | mg/L | NA | NA | 12 | 20 | 200 | 240 | 2000 |

# TABLE 1

## SUMMARY OF LEACHATE ANALYTICAL DATA
## FOUR COUNTY LANDFILL SITE
## FULTON COUNTY, INDIANA

| *Volatiles Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Methylene chloride | mg/L | 1.2 | ND(0.05) | 0.22 | ND(0.05) | 0.74 | 0.19 | 0.089 | 0.080 |
| Methyl methacrylate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-Methyl-2-pentanone (MIBK) | mg/L | 3.9 | 1.5 | 7.7 | 0.94 | 6.5 | 5.5 | 2.3 | 2.3 |
| Propionitrile (Ethyl cyanide) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Styrene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,1,1,2-Tetrachloroethane | mg/L | ND(0.25) | NA | NA | NA | NA | NA | NA | NA |
| 1,1,2,2-Tetrachloroethane | mg/L | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Tetrachloroethene | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Tetrahydrofuran | mg/L | NA | ND(0.25) | ND(0.10) | ND(0.10) | 5.3J | 1.8J | 0.74J | 0.84 |
| Toluene | mg/L | ND(0.25) | 0.13 | 0.33 | 0.082 | 0.32 | 0.20 | ND(0.025) | ND(0.025) |
| 1,1,1-Trichloroethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,1,2-Trichloroethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Trichloroethene | mg/L | ND(0.25) | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| Trichlorofluoromethane | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |
| 1,2,3-Trichloropropane | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Vinyl actetate | mg/L | ND(1.3) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| Vinyl chloride | mg/L | ND(1.3) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.05) | ND(0.05) | ND(0.05) |
| Xylenes (total) | mg/L | ND(0.25) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.025) | ND(0.025) | ND(0.025) |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | C [9] Secondary 11/2/89 | C [10] Secondary 11/2/89 | F039 Scan [11] 9/30/93 | HBN [12] | HBN x 10 [13] | HBN x 12 [14] | HBN x 100 [15] |
|---|---|---|---|---|---|---|---|---|
| *Volatiles Continued* | | | | | | | | |
| Methylene chloride | mg/L | 0.43 | 0.54 | 0.50 | 0.005 | 0.05 | 0.06 | 0.5 |
| Methyl methacrylate | mg/L | NA | NA | ND(0.005) | 3 | 30 | 36 | 300 |
| 4-Methyl-2-pentanone (MIBK) | mg/L | 7.0 | 6.6 | 4.4 | 2 | 20 | 24 | 200 |
| Propionitrile (Ethyl cyanide) | mg/L | NA | NA | ND(0.005) | NE | NE | NE | NE |
| Styrene | mg/L | ND(0.025) | ND(0.05) | NA | 0.1 | 1 | 1.2 | 10 |
| 1,1,1,2-Tetrachloroethane | mg/L | NA | NA | ND(0.005) | 0.001 | 0.01 | 0.012 | 0.1 |
| 1,1,2,2-Tetrachloroethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| Tetrachloroethene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| Tetrahydrofuran | mg/L | 4.1J | 2.5 | NA | NE | NE | NE | NE |
| Toluene | mg/L | ND(0.025) | ND(0.05) | 0.39J | 1 | 10 | 12 | 100 |
| 1,1,1-Trichloroethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.2 | 2 | 2.4 | 20 |
| 1,1,2-Trichloroethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| Trichloroethene | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 0.005 | 0.05 | 0.06 | 0.5 |
| Trichlorofluoromethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 10 | 100 | 120 | 1000 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 1000 | 10,000 | 12000 | 100,000 |
| 1,2,3-Trichloropropane | mg/L | NA | NA | ND(0.005) | 0.2 | 2 | 2.4 | 20 |
| Vinyl actetate | mg/L | ND(0.05) | ND(0.10) | NA | NE | NE | NE | NE |
| Vinyl chloride | mg/L | ND(0.05) | ND(0.10) | ND(0.01) | 0.002 | 0.02 | 0.024 | 0.2 |
| Xylenes (total) | mg/L | ND(0.025) | ND(0.05) | ND(0.005) | 10 | 100 | 120 | 1000 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Semivolatiles* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Acenaphthylene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Acetophenone | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Acetylaminofluorene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-Aminobiphenyl | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Aniline | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Anthracene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Aramite | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Benzo(a)anthracene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Benzo(b)fluoranthene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Benzo(k)fluoranthene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Benzo(g,h,i)perylene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Benzo(a)pyrene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Benzoic acid | mg/L | NA | NA | 66 | 5.5 | 220 | 87 | ND(0.20) | ND(0.20) |
| Benzyl alcohol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 4-Bromophenyl phenyl ether | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Butyl benzyl phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | 0.11 | 0.10 |
| Carbazole | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 4-Chloroaniline | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Chlorobenzilate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| bis(2-Chloroethoxy)methane | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| bis(2-Chloroethyl)ether | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| bis(2-Chloroisopropyl)ether | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 4-Chloro-3-methylphenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Semivolatiles* | *Concentration Units* | C [9] *Secondary 11/2/89* | C [10] *Secondary 11/2/89* | *F039 Scan* [11] *9/30/93* | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 2 | 20 | 24 | 200 |
| Acenaphthylene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Acetophenone | mg/L | NA | NA | ND(10) | 4 | 40 | 48 | 400 |
| 2-Acetylaminofluorene | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| 4-Aminobiphenyl | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Aniline | mg/L | NA | NA | ND(10) | 0.006 | 0.06 | 0.072 | 0.6 |
| Anthracene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Aramite | mg/L | NA | NA | ND(10) | 0.001 | 0.01 | 0.012 | 0.1 |
| Benzo(a)anthracene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0001 | 0.001 | 0.0012 | 0.01 |
| Benzo(b)fluoranthene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| Benzo(k)fluoranthene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Benzo(g,h,i)perylene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Benzo(a)pyrene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| Benzoic acid | mg/L | ND(1.0) | ND(1.0) | 99 | NE | NE | NE | NE |
| Benzyl alcohol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 10 | 100 | 120 | 1000 |
| 4-Bromophenyl phenyl ether | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Butyl benzyl phthalate | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.1 | 1 | 1.2 | 10 |
| Carbazole | mg/L | ND(1.0) | ND(1.0) | NA | NE | NE | NE | NE |
| 4-Chloroaniline | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.1 | 1 | 1.2 | 10 |
| Chlorobenzilate | mg/L | NA | NA | ND(10) | 0.7 | 7 | 8.4 | 70 |
| bis(2-Chloroethoxy)methane | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| bis(2-Chloroethyl)ether | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.00003 | 3E-04 | 0.00036 | 0.003 |
| bis(2-Chloroisopropyl)ether | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0005 | 0.005 | 0.006 | 0.05 |
| 4-Chloro-3-methylphenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Semivolatiles Continued* | *Concentration Units* | *4/22/87* 1 | *1/30/89* 2 | *A-North Primary 11/2/89* 3 | *A-North Secondary 11/2/89* 4 | *B Primary 11/2/89* 5 | *B Secondary 11/2/89* 6 | *C Primary 11/2/89* 7 | *C Primary 11/2/89* 8 |
|---|---|---|---|---|---|---|---|---|---|
| 2-Chloronaphthalene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2-Chlorophenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 4-Chlorophenyl phenyl ether | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Chrysene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Dibenz(a,h)anthracene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Dibenzo(a,e)pyrene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Dibenzofuran | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Di-n-butyl phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,2-Dichlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,3-Dichlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,4-Dichlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 3,3'-Dichlorobenzidine | mg/L | NA | NA | ND(0.08) | ND(0.04) | ND(0.40) | ND(0.16) | ND(0.08) | ND(0.08) |
| 2,4-Dichlorophenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2,6-Dichlorophenol | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Diethyl phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| p-Dimethylaminobenzene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 7,12-Dimethylbenz(a)anthracene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 3,3'-Dimethylbenzidine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| a,a-Dimethylphenylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-Dimethylphenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Dimethyl phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,4-Dinitrobenzene | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1000) | ND(0.40) | ND(0.20) | ND(0.20) |
| 4,6-Dinitro-2-methylphenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1000) | ND(0.40) | ND(0.20) | ND(0.20) |
| 2,4-Dinitrophenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1000) | ND(0.40) | ND(0.20) | ND(0.20) |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | C 9 Secondary 11/2/89 | C 10 Secondary 11/2/89 | F039 Scan 11 9/30/93 | HBN 12 | HBN x 10 13 | HBN x 12 14 | HBN x 100 15 |
|---|---|---|---|---|---|---|---|---|
| *Semivolatiles Continued* | | | | | | | | |
| 2-Chloronaphthalene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| 2-Chlorophenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.2 | 2 | 2.4 | 20 |
| 4-Chlorophenyl phenyl ether | mg/L | ND(0.20) | ND(0.20) | NA | NE | NE | NE | NE |
| Chrysene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| Dibenz(a,h)anthracene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0003 | 0.003 | 0.0036 | 0.03 |
| Dibenzo(a,e)pyrene | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Dibenzofuran | mg/L | ND(0.20) | ND(0.20) | NA | NE | NE | NE | NE |
| Di-n-butyl phthalate | mg/L | ND(0.20) | ND(0.20) | ND(10) | 4 | 40 | 48 | 400 |
| 1,2-Dichlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.6 | 6 | 7.2 | 60 |
| 1,3-Dichlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| 1,4-Dichlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.075 | 0.75 | 0.9 | 7.5 |
| 3,3'-Dichlorobenzidine | mg/L | ND(0.40) | ND(0.40) | NA | 0.00008 | 8E-04 | 0.00096 | 0.008 |
| 2,4-Dichlorophenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.1 | 1 | 1.2 | 10 |
| 2,6-Dichlorophenol | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Diethyl phthalate | mg/L | ND(0.20) | ND(0.20) | ND(10) | 30 | 300 | 360 | 3000 |
| p-Dimethylaminobenzene | mg/L | NA | NA | NA | NE | NE | NE | NE |
| 7,12-Dimethylbenz(a)anthracene | mg/L | NA | NA | NA | 0.000001 | 1E-05 | 0.000012 | 0.0001 |
| 3,3'-Dimethylbenzidine | mg/L | NA | NA | NA | 0.000004 | 4E-05 | 0.000048 | 0.0004 |
| a,a-Dimethylphenylamine | mg/L | NA | NA | NA | NE | NE | NE | NE |
| 2,4-Dimethylphenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.7 | 7 | 8.4 | 70 |
| Dimethyl phthalate | mg/L | ND(0.20) | ND(0.20) | NA | 400 | 4,000 | 4800 | 40,000 |
| 1,4-Dinitrobenzene | mg/L | ND(1.0) | ND(1.0) | ND(50) | NE | NE | NE | NE |
| 4,6-Dinitro-2-methylphenol | mg/L | ND(1.0) | ND(1.0) | ND(50) | NE | NE | NE | NE |
| 2,4-Dinitrophenol | mg/L | ND(1.0) | ND(1.0) | ND(50) | 0.07 | 0.7 | 0.84 | 7 |

**TABLE 1**

**SUMMARY OF LEACHATE ANALYTICAL DATA**
**FOUR COUNTY LANDFILL SITE**
**FULTON COUNTY, INDIANA**

| *Semivolatiles Continued* | *Concentration Units* | *4/22/87* 1 | *1/30/89* 2 | *A-North Primary 11/2/89* 3 | *A-North Secondary 11/2/89* 4 | *B Primary 11/2/89* 5 | *B Secondary 11/2/89* 6 | *C Primary 11/2/89* 7 | *C Primary 11/2/89* 8 |
|---|---|---|---|---|---|---|---|---|---|
| 2,4-Dinitrotoluene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2,6-Dinitrotoluene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Di-n-octyl phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Di-n-propylnitrosoamine | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Diphenylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2-Diphenyl hydrazine | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Diphenyl nitrosamine | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| bis(2-Ethylhexyl)phthalate | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Ethyl methanesulfonate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Fluoranthene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Fluorene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Hexachlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Hexachlorobutadiene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Hexachlorocyclopentadiene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Hexachloroethane | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Hexachlorophene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Hexachloropropene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Indeno(1,2,3-cd)pyrene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Isophorone | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Isosafrole | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Methapyrilene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 3-Methylcholanthrene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4-Methylene-bis-(2-chloroaniline) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| Semivolatiles Continued | Concentration Units | C [9] Secondary 11/2/89 | C [10] Secondary 11/2/89 | F039 Scan [11] 9/30/93 | HBN [12] | HBN x 10 [13] | HBN x 12 [14] | HBN x 100 [15] |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dinitrotoluene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.00005 | 5E-04 | 0.0006 | 0.005 |
| 2,6-Dinitrotoluene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.00005 | 5E-04 | 0.0006 | 0.005 |
| Di-n-octyl phthalate | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.7 | 7 | 8.4 | 70 |
| Di-n-propylnitrosoamine | mg/L | ND(0.20) | ND(0.20) | ND(50) | 5E-06 | 5E-05 | 0.00006 | 5E-04 |
| Diphenylamine | mg/L | NA | NA | ND(10) | 0.9 | 9 | 10.8 | 90 |
| 1,2-Diphenyl hydrazine | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.00004 | 4E-04 | 0.00048 | 0.004 |
| Diphenyl nitrosamine | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.007 | 0.07 | 0.084 | 0.7 |
| bis(2-Ethylhexyl)phthalate | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.006 | 0.06 | 0.072 | 0.6 |
| Ethyl methanesulfonate | mg/L | NA | NA | NA | 0.000001 | 1E-05 | 0.000012 | 0.0001 |
| Fluoranthene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 1 | 10 | 12 | 100 |
| Fluorene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 1 | 10 | 12 | 100 |
| Hexachlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.001 | 0.01 | 0.012 | 0.1 |
| Hexachlorobutadiene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0004 | 0.004 | 0.0048 | 0.04 |
| Hexachlorocyclopentadiene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.05 | 0.5 | 0.6 | 5 |
| Hexachloroethane | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.003 | 0.03 | 0.036 | 0.3 |
| Hexachlorophene | mg/L | NA | NA | NA | 0.01 | 0.1 | 0.12 | 1 |
| Hexachloropropene | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Indeno(1,2,3-cd)pyrene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0004 | 0.004 | 0.0048 | 0.04 |
| Isophorone | mg/L | ND(0.20) | ND(0.20) | NA | 0.009 | 0.09 | 0.108 | 0.9 |
| Isosafrole | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Methapyrilene | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| 3-Methylcholanthrene | mg/L | NA | NA | ND(10) | 0.000001 | 1E-05 | 0.000012 | 0.0001 |
| 4,4-Methylene-bis-(2-chloroaniline) | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Semivolatiles Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Methyl methanesulfonate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Methylnaphthalene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2-Methylphenol | mg/L | NA | NA | ND(0.04) | 0.11 | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 4-Methylphenol | mg/L | NA | NA | 7.2 | 1.7 | 14 | 7.4 | ND(0.04) | ND(0.04) |
| Naphthalene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,4-Naphthoquinone | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 1-Naphthylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Naphthylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Nitroaniline | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 3-Nitroaniline | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 4-Nitroaniline | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| Nitrobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2-Nitrophenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 4-Nitrophenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 4-Nitroquinoline-1-oxide | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitroso-di-n-butylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitrosodiethylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitrosodimethylamine | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| N-Nitrosomethylethylamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitrosomorpholine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitrosopiperidine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| N-Nitrosopyrrolidine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | C[9] Secondary 11/2/89 | C[10] Secondary 11/2/89 | F039 Scan[11] 9/30/93 | HBN[12] | HBN x 10[13] | HBN x 12[14] | HBN x 100[15] |
|---|---|---|---|---|---|---|---|---|
| *Semivolatiles Continued* | | | | | | | | |
| Methyl methanesulfonate | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| 2-Methylnaphthalene | mg/L | ND(0.20) | ND(0.20) | NA | NE | NE | NE | NE |
| 2-Methylphenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 2 | 20 | 24 | 200 |
| 4-Methylphenol | mg/L | ND(0.20) | ND(0.20) | 11 | 2 | 20 | 24 | 200 |
| Naphthalene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 1 | 10 | 12 | 100 |
| 1,4-Naphthoquinone | mg/L | NA | NA | NA | NE | NE | NE | NE |
| 1-Naphthylamine | mg/L | NA | NA | NA | NE | NE | NE | NE |
| 2-Naphthylamine | mg/L | NA | NA | ND(10) | 0.00004 | 4E-04 | 0.00048 | 0.004 |
| 2-Nitroaniline | mg/L | ND(1.0) | ND(1.0) | NA | NE | NE | NE | NE |
| 3-Nitroaniline | mg/L | ND(1.0) | ND(1.0) | NA | NE | NE | NE | NE |
| 4-Nitroaniline | mg/L | ND(1.0) | ND(1.0) | ND(50) | NE | NE | NE | NE |
| Nitrobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.02 | 0.2 | 0.24 | 2 |
| 2-Nitrophenol | mg/L | ND(0.20) | ND(0.20) | NA | NE | NE | NE | NE |
| 4-Nitrophenol | mg/L | ND(1.0) | ND(1.0) | ND(50) | NE | NE | NE | NE |
| 4-Nitroquinoline-1-oxide | mg/L | NA | NA | NA | NE | NE | NE | NE |
| N-Nitroso-di-n-butylamine | mg/L | NA | NA | ND(10) | 0.00006 | 6E-04 | 0.00072 | 0.006 |
| N-Nitrosodiethylamine | mg/L | NA | NA | ND(10) | 0.0000002 | 2E-06 | 0.0000024 | 0.00002 |
| N-Nitrosodimethylamine | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.0000007 | 7E-06 | 0.0000084 | 0.00007 |
| N-Nitrosomethylethylamine | mg/L | NA | NA | ND(10) | 0.000002 | 2E-05 | 0.000024 | 0.0002 |
| N-Nitrosomorpholine | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| N-Nitrosopiperidine | mg/L | NA | NA | ND(10) | 0.000008 | 8E-05 | 0.000096 | 0.0008 |
| N-Nitrosopyrrolidine | mg/L | NA | NA | ND(10) | 0.00002 | 2E-04 | 0.00024 | 0.002 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Semivolatiles Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| 5-Nitro-o-toluidine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachlorobenzene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachloroethane | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachloronitrobenzene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachlorophenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| Phenacetin | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Phenanthrene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | 0.027J | ND(0.04) |
| Phenol | mg/L | NA | NA | 45 | 3.1 | 137 | 32 | ND(0.04) | ND(0.04) |
| 4-Phenylenediamine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Phthalic anhydride | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-Picoline | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| Pronamide | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pyrene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Pyridine | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| Safrole | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,3,4-Tetrachlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,2,4,5-Tetrachlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2,3,4,6-Tetrachlorophenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| Toluenediamine | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 2-Toluidine | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-Trichlorobenzene | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 2,4,5-Trichlorophenol | mg/L | NA | NA | ND(0.20) | ND(0.10) | ND(1.0) | ND(0.40) | ND(0.20) | ND(0.20) |
| 2,4,6-Trichlorophenol | mg/L | NA | NA | ND(0.04) | ND(0.02) | ND(0.20) | ND(0.08) | ND(0.04) | ND(0.04) |
| 1,3,5-Trinitrobenzene | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Tris(2,3-dibromopropyl)phosphate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |

## TABLE 1

### SUMMARY OF LEACHATE ANALYTICAL DATA
### FOUR COUNTY LANDFILL SITE
### FULTON COUNTY, INDIANA

| *Semivolatiles Continued* | *Concentration Units* | C [9] *Secondary 11/2/89* | C [10] *Secondary 11/2/89* | *F039 Scan* [11] *9/30/93* | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| 5-Nitro-o-toluidine | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Pentachlorobenzene | mg/L | NA | NA | ND(10) | 0.03 | 0.3 | 0.36 | 3 |
| Pentachloroethane | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Pentachloronitrobenzene | mg/L | NA | NA | ND(10) | 0.0001 | 0.001 | 0.0012 | 0.01 |
| Pentachlorophenol | mg/L | ND(1.0) | ND(1.0) | ND(50) | 0.001 | 0.01 | 0.012 | 0.1 |
| Phenacetin | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Phenanthrene | mg/L | ND(0.20) | ND(0.20) | ND(10) | NE | NE | NE | NE |
| Phenol | mg/L | ND(0.20) | ND(0.20) | 87 | 20 [20] | 200 [20] | 240 | 2000 [20] |
| 4-Phenylenediamine | mg/L | NA | NA | ND(20) | 0.0007 | 0.007 | 0.0084 | 0.07 |
| Phthalic anhydride | mg/L | NA | NA | ND(20) | 70 [20] | 700 [20] | 840 [20] | 7000 [20] |
| 2-Picoline | mg/L | ND(1.0) | ND(1.0) | NA | NE | NE | NE | NE |
| Pronamide | mg/L | NA | NA | ND(10) | 3 | 30 | 36 | 300 |
| Pyrene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 1 | 10 | 12 | 100 |
| Pyridine | mg/L | ND(0.20) | ND(0.20) | ND(50) | 0.04 | 0.4 | 0.48 | 4 |
| Safrole | mg/L | NA | NA | ND(10) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| 1,2,3,4-Tetrachlorobenzene | mg/L | ND(0.20) | ND(0.20) | NA | NE | NE | NE | NE |
| 1,2,4,5-Tetrachlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.01 | 0.1 | 0.12 | 1 |
| 2,3,4,6-Tetrachlorophenol | mg/L | ND(1.0) | ND(1.0) | ND(10) | 1 [22] | 10 [22] | 12 [22] | 100 [22] |
| Toluenediamine | mg/L | ND(1.0) | ND(1.0) | NA | 1E-5/7 | 1E-4/70 | 1.2E-4/84 | IE-3/700 |
| 2-Toluidine | mg/L | NA | NA | NA | 0.0001 | 0.001 | 0.0012 | 0.01 |
| 1,2,4-Trichlorobenzene | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.07 | 0.7 | 0.84 | 7 |
| 2,4,5-Trichlorophenol | mg/L | ND(1.0) | ND(1.0) | ND(10) | 4 | 40 | 48 | 400 |
| 2,4,6-Trichlorophenol | mg/L | ND(0.20) | ND(0.20) | ND(10) | 0.003 | 0.03 | 0.036 | 0.3 |
| 1,3,5-Trinitrobenzene | mg/L | NA | NA | NA | 0.002 | 0.02 | 0.024 | 0.2 |
| Tris(2,3-dibromopropyl)phosphate | mg/L | NA | NA | NA | 0.00003 | 3E-04 | 0.00036 | 0.003 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Pesticides/PCBs* | *Concentration Units* | *4/22/87* 1 | *1/30/89* 2 | *A-North Primary 11/2/89* 3 | *A-North Secondary 11/2/89* 4 | *B Primary 11/2/89* 5 | *B Secondary 11/2/89* 6 | *C Primary 11/2/89* 7 | *C Primary 11/2/89* 8 |
|---|---|---|---|---|---|---|---|---|---|
| Aldrin | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| Aroclor 1016 | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Aroclor 1221 | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Aroclor 1232 | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Aroclor 1242 | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Aroclor 1248 | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Aroclor 1254 | mg/L | NA | NA | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) |
| Aroclor 1260 | mg/L | NA | NA | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) |
| alpha-BHC | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| beta-BHC | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| delta-BHC | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| gamma-BHC (Lindane) | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| alpha-Chlordane | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| gamma-Chlordane | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| 2,4'-DDD | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4'-DDD | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| 2,4'-DDE | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4'-DDE | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| 2,4'-DDT | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4'-DDT | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Dieldrin | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Endosulfan I | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| Endosulfan II | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Endosulfan sulfate | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |

**TABLE 1**

**SUMMARY OF LEACHATE ANALYTICAL DATA**
**FOUR COUNTY LANDFILL SITE**
**FULTON COUNTY, INDIANA**

| *Pesticides/PCBs* | *Concentration Units* | C [9] *Secondary 11/2/89* | C [10] *Secondary 11/2/89* | *F039 Scan* [11] *9/30/93* | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| Aldrin | mg/L | ND(0.005) | ND(0.005) | 0.0028 | 0.000002 | 2E-05 | 0.000024 | 0.0002 |
| Aroclor 1016 | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1221 | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1232 | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1242 | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1248 | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1254 | mg/L | ND(0.10) | ND(0.10) | ND(0.01) | 0.0005 | 0.005 | 0.006 | 0.05 |
| Aroclor 1260 | mg/L | ND(0.10) | ND(0.10) | ND(0.01) | 0.0005 | 0.005 | 0.006 | 0.05 |
| alpha-BHC | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | 0.000005 | 5E-05 | 0.00006 | 0.0005 |
| beta-BHC | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | 0.00002 | 2E-04 | 0.00024 | 0.002 |
| delta-BHC | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | NE | NE | NE | NE |
| gamma-BHC (Lindane) | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| alpha-Chlordane | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.002 | 0.02 | 0.024 | 0.2 |
| gamma-Chlordane | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.002 | 0.02 | 0.024 | 0.2 |
| 2,4'-DDD | mg/L | NA | NA | ND(0.001) | NE | NE | NE | NE |
| 4,4'-DDD | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | 0.0001 | 0.001 | 0.0012 | 0.01 |
| 2,4'-DDE | mg/L | NA | NA | ND(0.001) | NE | NE | NE | NE |
| 4,4'-DDE | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | 0.0001 | 0.001 | 0.0012 | 0.01 |
| 2,4'-DDT | mg/L | NA | NA | ND(0.001) | NE | NE | NE | NE |
| 4,4'-DDT | mg/L | ND(0.01) | ND(0.01) | 0.0013 | 0.0001 | 0.001 | 0.0012 | 0.01 |
| Dieldrin | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | 0.000002 | 2E-05 | 0.000024 | 0.0002 |
| Endosulfan I | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | 0.002 | 0.02 | 0.024 | 0.2 |
| Endosulfan II | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | 0.002 | 0.02 | 0.024 | 0.2 |
| Endosulfan sulfate | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | NE | NE | NE | NE |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Pesticides/PCBs Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Endrin | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Endrin aldehyde | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Endrin ketone | mg/L | NA | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Heptachlor | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| Heptachlor epoxide | mg/L | NA | NA | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) | ND(0.005) |
| Isodrin | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Kepone | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Methoxychlor | mg/L | NA | NA | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) | ND(0.05) |
| Toxaphene | mg/L | NA | NA | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) | ND(0.10) |
| *Organophosphorus Pesticides* | | | | | | | | | |
| Dimethoate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Disulfoton | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Famphur | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| O,O,O-Triethylphosphorothioate | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Parathion | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Methyl parathion | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Phorate (Thimet) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Sulfotepp | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Thionazin | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |

# TABLE 1

## SUMMARY OF LEACHATE ANALYTICAL DATA
## FOUR COUNTY LANDFILL SITE
## FULTON COUNTY, INDIANA

| | Concentration Units | C [9] Secondary 11/2/89 | C [10] Secondary 11/2/89 | F039 Scan [11] 9/30/93 | HBN [12] | HBN x 10 [13] | HBN x 12 [14] | HBN x 100 [15] |
|---|---|---|---|---|---|---|---|---|
| ***Pesticides/PCBs Continued*** | | | | | | | | |
| Endrin | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | 0.002 | 0.02 | 0.024 | 0.2 |
| Endrin aldehyde | mg/L | NA | NA | ND(0.001) | NE | NE | NE | NE |
| Endrin ketone | mg/L | ND(0.01) | ND(0.01) | ND(0.001) | NE | NE | NE | NE |
| Heptachlor | mg/L | ND(0.005) | ND(0.005) | 0.0015 | 0.0004 | 0.004 | 0.0048 | 0.04 |
| Heptachlor epoxide | mg/L | ND(0.005) | ND(0.005) | ND(0.0005) | 0.0002 | 0.002 | 0.0024 | 0.02 |
| Isodrin | mg/L | NA | NA | ND(10) | NE | NE | NE | NE |
| Kepone | mg/L | NA | NA | ND(10) | 0.000002 | 2E-05 | 0.000024 | 0.0002 |
| Methoxychlor | mg/L | ND(0.05) | ND(0.05) | ND(0.005) | 0.04 | 0.4 | 0.48 | 4 |
| Toxaphene | mg/L | ND(0.10) | ND(0.10) | ND(0.01) | 0.003 | 0.03 | 0.036 | 0.3 |
| ***Organophosphorus Pesticides*** | | | | | | | | |
| Dimethoate | mg/L | NA | NA | NA | 0.007 | 0.07 | 0.084 | 0.7 |
| Disulfoton | mg/L | NA | NA | ND(10) | 0.001 | 0.01 | 0.012 | 0.1 |
| Famphur | mg/L | NA | NA | ND(10) | 0.001 | 0.01 | 0.012 | 0.1 |
| O,O,O-Triethylphosphorothioate | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Parathion | mg/L | NA | NA | ND(10) | 0.2 | 2 | 2.4 | 20 |
| Methyl parathion | mg/L | NA | NA | ND(10) | 0.009 | 0.09 | 0.108 | 0.9 |
| Phorate (Thimet) | mg/L | NA | NA | ND(10) | 0.007 | 0.07 | 0.084 | 0.7 |
| Sulfotepp | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Thionazin | mg/L | NA | NA | NA | NE | NE | NE | NE |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | 4/22/87 [1] | 1/30/89 [2] | A-North Primary 11/2/89 [3] | A-North Secondary 11/2/89 [4] | B Primary 11/2/89 [5] | B Secondary 11/2/89 [6] | C Primary 11/2/89 [7] | C Primary 11/2/89 [8] |
|---|---|---|---|---|---|---|---|---|---|
| *Chlorinated Herbicides* | | | | | | | | | |
| 2,4-D | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4,5-T | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4,5-TP (Silvex) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Dinoseb (2-sec-Butyl-4,6-dinitrophenol) | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| *PCDD/PCDF* | | | | | | | | | |
| Tetrachlorodibenzodioxins | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachlorodibenzodioxins | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Hexachlorodibenzodioxins | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Heptachlorodibenzodioxins | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Octachlorodibenzodioxins | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Tetrachlorodibenzofurans | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Pentachlorodibenzofurans | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Hexachlorodibenzofurans | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Heptachlorodibenzofurans | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Octachlorodibenzofurans | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | Concentration Units | C[9] Secondary 11/2/89 | C[10] Secondary 11/2/89 | F039 Scan[11] 9/30/93 | HBN[12] | HBN x 10[13] | HBN x 12[14] | HBN x 100[15] |
|---|---|---|---|---|---|---|---|---|
| *Chlorinated Herbicides* | | | | | | | | |
| 2,4-D | mg/L | NA | NA | ND(0.10) | 0.07 | 0.7 | 0.84 | 7 |
| 2,4,5-T | mg/L | NA | NA | ND(0.50) | 0.4 | 4 | 4.8 | 40 |
| 2,4,5-TP (Silvex) | mg/L | NA | NA | ND(0.50) | 0.05 | 0.5 | 0.6 | 5 |
| Dinoseb (2-sec-Butyl-4,6-dinitrophenol) | mg/L | NA | NA | ND(10) | 0.007 | 0.07 | 0.084 | 0.7 |
| *PCDD/PCDF* | | | | | | | | |
| Tetrachlorodibenzodioxins | mg/L | NA | NA | ND(0.00074) | 0.00000005 [20] | 5E-07 [20] | 0.0000006 [20] | 0.000005 [20] |
| Pentachlorodibenzodioxins | mg/L | NA | NA | ND(0.0013) | 4E-10 [20] | 4E-09 [20] | 4.8E-09 [20] | 0.00000004 [20] |
| Hexachlorodibenzodioxins | mg/L | NA | NA | ND(0.0022) | 2E-09 [20] | 2E-08 [20] | 2.4E-08 [20] | 0.0000002 [20] |
| Heptachlorodibenzodioxins | mg/L | NA | NA | ND(0.0022) | 0.00000002 [20] | 2E-07 [20] | 0.00000024 [20] | 0.000002 [20] |
| Octachlorodibenzodioxins | mg/L | NA | NA | ND(0.0036) | 0.0000002 [20] | 2E-06 [20] | 0.0000024 [20] | 0.00002 [20] |
| Tetrachlorodibenzofurans | mg/L | NA | NA | ND(0.00062) | 2E-09 [20] | 2E-08 [20] | 2.4E-08 [20] | 0.0000002 [20] |
| Pentachlorodibenzofurans | mg/L | NA | NA | ND(0.00089) | 4E-10 [20] | 4E-09 [20] | 4.8E-09 [20] | 4E-08 [20] |
| Hexachlorodibenzofurans | mg/L | NA | NA | ND(0.0021) | 2E-09 [20] | 2E-08 [20] | 2.4E-08 [20] | 0.0000002 [20] |
| Heptachlorodibenzofurans | mg/L | NA | NA | ND(0.0021) | 0.0000002 [20] | 2E-07 [20] | 0.00000024 [20] | 0.000002 [20] |
| Octachlorodibenzofurans | mg/L | NA | NA | ND(0.0020) | 0.0000002 [20] | 2E-06 [20] | 0.0000024 [20] | 0.00002 [20] |

**TABLE 1**

**SUMMARY OF LEACHATE ANALYTICAL DATA**
**FOUR COUNTY LANDFILL SITE**
**FULTON COUNTY, INDIANA**

| *Inorganics* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| Antimony | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Barium | mg/L | 0.06 | NA | 2.8 | 0.30 | 1.9 | 0.66 | 1.1 | 1.1 |
| Beryllium | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Cadmium | mg/L | 0.025 | NA | ND(0.5) | ND(0.005) | ND(0.5) | ND(0.005) | ND(0.005) | ND(0.005) |
| Calcium | mg/L | 360 | NA | NA | NA | NA | NA | NA | NA |
| Chromium | mg/L | 0.036 | NA | 0.59 | 0.04 | 0.04 | 0.20 | 0.07 | 0.07 |
| Cobalt | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Copper | mg/L | 0.77 | NA | NA | NA | NA | NA | NA | NA |
| Iron | mg/L | NA | NA | 420 | 24 | 61 | 9.6 | 7.7 | 7.3 |
| Manganese | mg/L | NA | NA | 23 | 1.9 | 6.7 | 5.7 | 14 | 13 |
| Nickel | mg/L | 0.18 | NA | 4.9 | 0.28 | 1.8 | 1.0 | 2.4 | 2.4 |
| Silver | mg/L | ND(0.01) | NA | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) | ND(0.01) |
| Sodium | mg/L | NA | NA | 5,600 | 2,000 | 6,700 | 5,200 | 2,900 | 2,900 |
| Tin | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Zinc | mg/L | 0.49 | NA | NA | NA | NA | NA | NA | NA |
| Arsenic | mg/L | 0.023 | NA | 0.18 | ND(0.020) | 0.24 | 0.065 | 0.070 | ND(0.10) |
| Lead | mg/L | 0.23 | NA | 0.53 | ND(0.010) | ND(0.010) | ND(0.025) | ND(0.020) | ND(0.020) |
| Thallium | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Selenium | mg/L | 0.014 | NA | 0.22 | ND(0.010) | ND(0.10) | ND(0.020) | ND(0.0550) | ND(0.020) |
| Mercury | mg/L | ND(0.0005) | NA | ND(0.0002) | ND(0.0002) | ND(0.0020) | ND(0.0020) | ND(0.0020) | ND(0.0002) |
| Cyanide | mg/L | 0.48 | NA | 0.02 | ND(0.01) | 0.18 | 0.02 | ND(0.01) | 0.08 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| | *Concentration Units* | C [9] *Secondary 11/2/89* | C [10] *Secondary 11/2/89* | *F039 Scan* [11] *9/30/93* | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| *Inorganics* | | | | | | | | |
| Antimony | mg/L | NA | NA | ND(0.030) | 0.006 | 0.06 | 0.072 | 0.6 |
| Barium | mg/L | 2.5 | 2.6 | 0.67 | 2 | 20 | 24 | 200 |
| Beryllium | mg/L | NA | NA | ND(0.0050) | 0.004 | 0.04 | 0.048 | 0.4 |
| Cadmium | mg/L | ND(0.5) | ND(0.5) | ND(0.0050) | 0.005 | 0.05 | 0.06 | 0.5 |
| Calcium | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Chromium | mg/L | 0.17 | 0.17 | 0.026 | 0.1 | 1 | 1.2 | 10 |
| Cobalt | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Copper | mg/L | NA | NA | 0.026 | NE | NE | NE | NE |
| Iron | mg/L | 75 | 78 | NA | NE | NE | NE | NE |
| Manganese | mg/L | 17 | 18 | NA | NE | NE | NE | NE |
| Nickel | mg/L | 10 | 11 | 2.4 | 0.1 | 1 | 1.2 | 10 |
| Silver | mg/L | ND(0.01) | ND(0.01) | ND(0.01) | 0.2 | 2 | 2.4 | 20 |
| Sodium | mg/L | 6,000 | 6,000 | NA | NE | NE | NE | NE |
| Tin | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Vanadium | mg/L | NA | NA | 0.061 | 0.2 | 2 | 2.4 | 20 |
| Zinc | mg/L | NA | NA | 0.067 | 7 | 70 | 84 | 700 |
| Arsenic | mg/L | 0.14 | 0.061 | 0.11 | 0.05 | 0.5 | 0.6 | 5 |
| Lead | mg/L | ND(0.040) | ND(0.020) | 0.094 | 0.015 | 0.15 | 0.18 | 1.5 |
| Thallium | mg/L | NA | NA | ND(0.30) | 0.002 | 0.02 | 0.024 | 0.2 |
| Selenium | mg/L | ND(0.110) | ND(0.110) | 0.15 | 0.05 | 0.5 | 0.6 | 5 |
| Mercury | mg/L | ND(0.0020) | ND(0.0020) | ND(0.00050) | 0.002 | 0.02 | 0.024 | 0.2 |
| Cyanide | mg/L | 0.08 | 0.11 | 0.21 | 0.2 | 2 | 2.4 | 20 |

TABLE 1

SUMMARY OF LEACHATE ANALYTICAL DATA
FOUR COUNTY LANDFILL SITE
FULTON COUNTY, INDIANA

| *Inorganics Continued* | *Concentration Units* | *4/22/87* [1] | *1/30/89* [2] | *A-North Primary 11/2/89* [3] | *A-North Secondary 11/2/89* [4] | *B Primary 11/2/89* [5] | *B Secondary 11/2/89* [6] | *C Primary 11/2/89* [7] | *C Primary 11/2/89* [8] |
|---|---|---|---|---|---|---|---|---|---|
| TDS | mg/L | 4,600 | 22,000 | 24,000 | 9,800 | 33,000 | 9,400 | 18,000 | 17,000 |
| TS | mg/L | NA | 34,000 | 26,000 | 9,900 | 37,000 | 26,000 | 18,000 | 18,000 |
| Oil and Grease | mg/L | 8 | NA | NA | NA | NA | NA | NA | NA |
| pH | su | 8.3 | 7.1 | 7.3 | 7.3 | 6.5 | 7.2 | 7.0 | 7.1 |
| Alkalinity | mg/L | 600 | NA | NA | NA | NA | NA | NA | NA |
| Phenols | mg/L | 35 | NA | 68 | 8.5 | 200 | 60 | 73 | 71 |
| TOC | mg/L | NA | 5,100 | 3,500 | 1,600 | 8,500 | 4,800 | 260 | 4,400 |
| TOX | mg/L | NA | 0.34 | 3.4 | 9.6 | 4.2 | 4.5 | 3.3 | 2.4 |
| Specific Conductance | µmhos/cm | NA | >20,000 | 29,000 | 15,000 | 38,000 | 32,000 | 21,000 | 21,000 |
| Fluoride | mg/L | NA | NA | NA | NA | NA | NA | NA | NA |
| Chloride | mg/L | 1,500 | 13,000 | 8,800 | 4,300 | 12,000 | 9,000 | 5,300 | 5,300 |
| Sulfate | mg/L | 500 | 590 | 500 | ND(25) | 410 | 410 | 60 | 60 |
| Sulfide | mg/L | ND(0.1) | NA | ND(8) | ND(8) | ND(8) | ND(8) | ND(8) | ND(8) |

TABLE 1

**SUMMARY OF LEACHATE ANALYTICAL DATA**
**FOUR COUNTY LANDFILL SITE**
**FULTON COUNTY, INDIANA**

| *Inorganics Continued* | *Concentration Units* | C [9] *Secondary 11/2/89* | C [10] *Secondary 11/2/89* | *F039 Scan* [11] *9/30/93* | *HBN* [12] | *HBN x 10* [13] | *HBN x 12* [14] | *HBN x 100* [15] |
|---|---|---|---|---|---|---|---|---|
| TDS | mg/L | 37,000 | 37,000 | NA | NE | NE | NE | NE |
| TS | mg/L | 43,000 | 42,000 | NA | NE | NE | NE | NE |
| Oil and Grease | mg/L | NA | NA | NA | NE | NE | NE | NE |
| pH | su | 6.5 | 6.4 | NA | NE | NE | NE | NE |
| Alkalinity | mg/L | NA | NA | NA | NE | NE | NE | NE |
| Phenols | mg/L | 240 | 250 | NA | NE | NE | NE | NE |
| TOC | mg/L | 12,000 | 12,000 | NA | NE | NE | NE | NE |
| TOX | mg/L | 7.1 | 1.9 | NA | NE | NE | NE | NE |
| Specific Conductance | µmhos/cm | 38,000 | 40,000 | NA | NE | NE | NE | NE |
| Fluoride | mg/L | NA | NA | 1.4 | 4 | 40 | 48 | 400 |
| Chloride | mg/L | 11,000 | 11,000 | NA | NE | NE | NE | NE |
| Sulfate | mg/L | 720 | 590 | NA | NE | NE | NE | NE |
| Sulfide | mg/L | ND(8) | ND(8) | 8.4 | NE | NE | NE | NE |

# TABLE 1

## SUMMARY OF LEACHATE ANALYTICAL DATA
## FOUR COUNTY LANDFILL SITE
## FULTON COUNTY, INDIANA

**Notes:**

1 Sample collected from the leachate storage tanks on 4/22/87 by EWC. Data contained in document entitled, "Four County Landfill Leachate Treatment at POTW", Meeting of City of Kokomo and Indiana Department of Environmental Management (IDEM), June 15, 1992 (POTW Document).
2 Sample collected as a composite from three leachate storage tanks on 1/30/89 by EWC. Data contained in POTW Document.
3 Sample collected from the primary leachate system in the A-North Cell on 11/2/89 by IDEM. Data contained in document entitled, "Analysis of Primary Liners at Four County Landfill", Indiana Department of Environmental Management, January 24, 1990 (IDEM Document).
4 Sample collected from the secondary leachate system in the A-North Cell on 11/2/89. Data contained in IDEM Document.
5 Sample collected from the primary leachate system in the B Cell on 11/2/89. Data contained in IDEM Document.
6 Sample collected from the secondary leachate system in the B Cell on 11/2/89. Data contained in IDEM Document.
7 Sample collected from the primary leachate system in the C Cell on 11/2/89. Data contained in IDEM Document.
8 Sample collected from the primary leachate system in the C Cell on 11/2/89. Data contained in IDEM Document.
9 Sample collected from the secondary leachate system in the C Cell on 11/2/89. Data contained in IDEM Document.
10 Sample collected from the secondary leachate system in the C Cell on 11/2/89. Data contained in IDEM Document.
11 Sample collected on 9/30/93 by Conestoga-Rovers & Associates for analysis of F039 parameters.
12 U.S. EPA health based concentration numbers presented in the "Docket Report on Health-Based Levels and Solubilities Used in the Evaluation of Delisting Petitions, Submitted Under 40 CFR 260.20 and 260.22", July 1992 (Docket).
13 U.S. EPA health based concentration numbers presented in the Docket with dilution attenuation factor (DAF) of 10.
14 U.S. EPA health based concentration numbers presented in the Docket with DAF of 12.
15 U.S. EPA health based concentration numbers presented in the Docket with a DAF of 100.
16 *- Concentration exceeded health based number; **- Concentration exceeded health based number x 10; ***- Concentration exceeded health based number x 100
17 Not detected at quantitation limit stated in parantheses.
18 Not analyzed
19 Estimated quantity
20 Health based number derived from the Hazardous Waste Identification Proposed Rule published in The Federal Register, Vol. 57, No. 98, May 20, 1992.
21 cis/trans isomer limits
22 2,4 isomer/2,6 isomer

# TABLE 2

## LEACHATE LOADING SUMMARY
## FOUR COUNTY LANDFILL
## FULTON COUNTY, INDIANA

| *Analyte* | *Maximum Observed Concentration* [1] *(mg/L)* | *Range of Expected Loading* [2] *(kg/month)* |
|---|---|---|
| Volatile Organic Compounds (VOCs) | | |
| Acetone | 17 | 3.2 - 4.6 |
| 2-Butanone | 11 | 2.1 - 3.0 |
| n-Butyl alcohol | 120 | 22.7 - 32.3 |
| 1,1-Dichloroethane | 0.078 | 0.015 - 0.021 |
| 1,2-Dichloroethane | 0.09 | 0.017 - 0.024 |
| Isobutanol | 42 | 7.9 - 11.3 |
| 2-Hexanone | 0.095 | 0.018 - 0.026 |
| Methanol | 12 | 2.3 - 3.2 |
| Methylene Chloride | 1.2 | 0.23 - 0.32 |
| Methyl isobutyl ketone | 7.7 | 1.5 - 2.1 |
| Tetrahydrofuran | 5.3 | 1.0 - 1.4 |
| Toluene | 0.39 | 0.07 - 0.10 |
| Semi Volatile Organic Compounds (SVOCs) | | |
| Benzoic acid | 220 | 41.6 - 59.2 |
| Butylbenzylphthalate | 0.11 | 0.021 - 0.030 |
| 2-Methyl phenol | 0.11 | 0.021 - 0.030 |
| 4-Methyl phenol | 14 | 2.6 - 3.8 |
| Phenol | 137 | 25.9 - 36.8 |
| Pesticides | | |
| Aldrin | 0.0028 | 5.3E-4 - 7.5E-4 |
| 4,4'-DDT | 0.0013 | 2.5E-4 - 3.5E-4 |
| Heptachlor | 0.015 | 2.8E-3 - 4.0E-3 |

# TABLE 2

## LEACHATE LOADING SUMMARY
## FOUR COUNTY LANDFILL
## FULTON COUNTY, INDIANA

| *Analyte* | *Maximum Observed Concentration* [1] *(mg/L)* | *Range of Expected Loading* [2] *(kg/month)* |
|---|---|---|
| Inorganic Parameters | | |
| Barium | 2.8 | 0.53 - 0.75 |
| Cadmium | 0.025 | 4.7E-3 - 6.7E-3 |
| Calcium | 360 | 68.0 - 96.8 |
| Chromium | 0.59 | 0.11 - 0.16 |
| Copper | 0.77 | 0.15 - 0.21 |
| Iron | 420 | 79.4 - 113.0 |
| Manganese | 23 | 4.4 - 6.2 |
| Nickel | 11 | 2.1 - 3.0 |
| Sodium | 6,700 | 1,266 - 1,802 |
| Vanadium | 0.061 | 0.012 - 0.016 |
| Zinc | 0.067 | 0.013 - 0.018 |
| Arsenic | 0.14 | 0.026 - 0.038 |
| Lead | 0.53 | 0.10 - 0.14 |
| Selenium | 0.22 | 0.042 - 0.060 |
| Cyanide (total) | 0.48 | 0.091 - 0.13 |

1 Maximum concentration obtained from data summary presented on Table 1.

2 Expected loading based upon 50,000 to 71,000 gallons (189,000 to 269,000 liters) of leachate per month.

TABLE 3

PREDICTED ANALYTE CONCENTRATIONS AT THE POTW
FOUR COUNTY LANDFILL
FULTON COUNTY, INDIANA

Plant Flow (MGD)/(MLD) [1] 15/57
Four County Flow (MGD)/(MLD) 0.015/0.057

| *Parameter* | *Raw Sewage Concentration (mg/L)* [2] | *Maximum Observed Four County Concentration (mg/L)* [3] | *Corresponding Maximum Adjusted Concentration (mg/L)* [4] |
|---|---|---|---|
| VOCs | | | |
| Acetone | 0.01 | 17 | 0.027 |
| 2-Butanone | 0.005 | 11 | 0.016 |
| n-Butyl Alcohol | 0 | 120 | 0.120 |
| 1,1-Dichloroethane | 0.0005 | 0.078 | 0.0006 |
| 1,2-Dichloroethane | 0.0005 | 0.09 | 0.0006 |
| Isobutanol | 0 | 42 | 0.042 |
| 2-Hexanone | 0.005 | 0.095 | 0.0051 |
| Methanol | 0 | 12 | 0.012 |
| Methylene Chloride | 0.005 | 1.2 | 0.0062 |
| Methyl Isobutyl Ketone | 0 | 7.7 | 0.0077 |
| Tetrahydrofuran | 0.005 | 5.3 | 0.010 |
| Toluene | 0.0005 | 0.39 | 0.0009 |
| SVOCs | | | |
| Benzoic Acid | 0.01 | 220 | 0.230 |
| Butylbenzylphthalate | 0 | 0.11 | 0.0001 |
| 2-Methyl Phenol | 0.01 | 0.11 | 0.010 |
| 4-MethylPhenol | 0.01 | 14 | 0.024 |
| Phenol | 0.01 | 137 | 0.147 |
| Pesticides | | | |
| Aldrin | 0.00005 | 0.0028 | 0.0001 |
| 4,4-DDT | 0.00005 | 0.0013 | 0.0001 |
| Heptachlor | 0.00005 | 0.015 | 0.0001 |

# TABLE 3

## PREDICTED ANALYTE CONCENTRATIONS AT THE POTW
## FOUR COUNTY LANDFILL
## FULTON COUNTY, INDIANA

Plant Flow (MGD)/(MLD) [1] 15/57
Four County Flow (MGD)/(MLD) 0.015/0.057

| *Parameter* | *Raw Sewage Concentration (mg/L)* [2] | *Maximum Observed Four County Concentration (mg/L)* [3] | *Corresponding Maximum Adjusted Concentration (mg/L)* [4] |
|---|---|---|---|
| <u>Inorganics</u> | | | |
| Barium | 0 | 2.8 | 0.0028 |
| Cadmium | 0.009 | 0.025 | 0.0090 |
| Calcium | 0 | 360 | 0.360 |
| Chromium | 0.013 | 0.59 | 0.014 |
| Copper | 0.15 | 0.77 | 0.151 |
| Iron | 2.12 | 420 | 2.54 |
| Manganese | 0 | 23 | 0.023 |
| Nickel | 0.04 | 11 | 0.051 |
| Sodium | 0 | 6700 | 6.693 |
| Vanadium | 0 | 0.061 | 0.0001 |
| Zinc | 0.397 | 0.067 | 0.397 |
| Arsenic | 0 | 0.14 | 0.0001 |
| Lead | 0.048 | 0.53 | 0.048 |
| Selenium | 0 | 0.22 | 0.0002 |
| Cyanide (total) | 0 | 0.48 | 0.0005 |

1 Projected flow is in million gallons per day (MGD) and million liters per day (MLD).
2 mg/L = micrograms per liter. Raw sewage concentrations provided by Kokomo POTW operations staff.
3 Maximum concentrations obtained from data summary presented in Table 1.
4 Expected concentration based upon delivery of 15,000 gallons to the POTW in a given day.